



Strategic Golf

William Roy Kesting &
Kathy Kesting Woods

Strategic Planning
For All Golfers
Derived From
"The Market Value
System for
New Business
Development"

CD Version Published October, 2007

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ISBN 978-1-60402-420-3

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Acknowledgements

The ideas and concepts presented in this book are mine. They have coalesced in my mind over the last twenty years, due largely to the contribution and clarity that was added by my daughter, Kathy Kesting Woods. Kathy's contributions have been so many and varied that she became my co-author. Our collaboration to write this book demonstrates that both art and science affect the entire innovation process. Both of these disciplines are required for thorough communication. Thanks Kathy!

I must also thank my son-in-law, Thomas Woods, who is President and Founder of Woods Creative Services. Tom designed and manages KVC's website, www.kestingventures.com. Tom has also designed this book and all of KVC's literature. Thanks Tom!

I also wish to give a special thanks to my beautiful and loving wife, Mary D'Auria Kesting, who is certainly among the world's best friends, partners, mothers and grandmothers. Mary has encouraged me to play golf for more than fifty years and has always helped me pursue my dreams. Thanks Mary!

My son, Roy Joseph Kesting, has critiqued many of KVC's projects, which has certainly contributed to this book. Roy has also successfully utilized the Market Value System to help Micros of Central Florida. Our daily dialog about current events, history and politics has been especially helpful. Thanks Roy!

My daughter, Joyce Mary Housel CPA, has always helped KVC keep its books accurate and current. Joyce has also made many contributions to KVC's courses. Thanks Joyce!

My son, William Robert Kesting, has always encouraged me to relax and enjoy life. We frequently seek each other's advice and counsel on many business matters. Bill has helped me immensely. Thanks Bill!

My grandchildren, Christopher Keith Woods, Jessie Rachel Woods, Lisa Marie Housel, Michael Stewart Kesting, Cara Grace House, Julia Rose Housel, Alicia Grace Kesting, and Jon Jeffrey Housel have been a tremendous joy, which helped me immensely. Thanks kids!

I have had the good fortune to be taught by many excellent teachers and professors. Special thanks go to: Mother Cecilia, Brother Ryan, Father Jablonski, Brother James, Professor Kemper, Professor Tolk and Father Fitzsimmons.

During my career in the corporate world I have listened to and learned from a number of gifted professionals. Special thanks go to: Dan Turissinni, John Fedoruk, George Kazan, Lee Rivers, Norm Christopher, Tom Mariani and Lester Conrad.

Many of KVC's clients have not only contributed greatly to the Market Value System but have also become colleagues and friends. Special thanks go to: Bob Boysen, Jim Lee, Steve Frandsen, Bill Zane, Abe Fenster, Peter Bromley, Mark Knorr, Jack Dyer, Bill Breen, Steve Gruner, Leo Hakka, Joe Flesher, Jim Davis, Tony DiSalvo, Bruce Grotefend, Don Remboski, Ken English, Cyril Langman, Barbara Yuill, Bob Reardon and Gary Williams.

KVC's partners and associates have also helped me develop my thoughts. Special thanks go to Gregg Ramsey, Steve Gruner, Bob Hawkins, Tom Swiger, Bob Ference and Bill Claus.

Last but not least, I have been encouraged and influenced by a number of close friends among whom are: Joe Gay, Ken Lacy, Fred DiMaria, Paul Caso, Brad Townsend, John Cholewin, Charles Bonasera, Bob Nickerson, Jim Crosslin and Bill Bridwell.

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Introduction

Just like more than fifty million people throughout the world, our hobby is the sport of golf. Our shot-making ability leaves a lot to be desired, but we enjoy the sport, know and follow the rules, and believe that solving puzzles on a golf course teaches us many lessons that help us deal with life's challenges.

William Roy Kesting is a chemist, who has developed the science of experiential modeling. This science enables people to develop mathematical models of their knowledge, so that they can use them to better solve complex scientific and market puzzles.

Kathy Woods is an artist, who specializes in the communication of technical information. Roy and Kathy have worked together for more than twenty years to:

- Show people how to create mathematical models of their knowledge, and
- Teach them how to use their models once they have them.

The world is immersed in a knowledge age, which ought to mean that people have endless opportunities to create new products and services based on their knowledge. Fifty years ago, how many of us would have predicted that a new knowledge based company like Microsoft would exceed the capitalization of General Motors and that most of the new value-added jobs would be in knowledge based industries?

Imagine that the President of a company announced to the world that his company will develop products and services for a specific market. He has made a decision and his public relations department has prepared a press release. Would you pay for that press release? Does it have any inherent worth? The answer is self-evident. A press release is not a knowledge block.

Now, let's suppose that the company's scientists, marketing specialists and business people have developed a mathematical model of a complete list of properties that a specific market requires. In addition, they have used their judgment to decipher which combinations of properties need to be improved from the perspective of the market. They have also included the technical levers that they and their competitors can use to eliminate the sought after property gaps in their mathematical model of properties, such that they know with certainty that they can produce and profitability market their new products. They also know that certain technical levers combine to produce unique and unexpected combinations of properties that should give the company a sustainable advantage and patents have been issued. All of this is recorded in a digital file along with glossaries of terms and instructions concerning how to use the models. Six copies of everything have been printed and are bound in large numbered manuals marked company confidential.

Imagine that this is a private company and the President is the Owner. To gain investment capital the Owner/President decides to seek a partner. His company will invest its intellectual property and the partner will provide investment capital. The company's bound manuals, computer files, glossaries, business plans, patents and supporting evidence are knowledge blocks. Knowledge blocks are frequently worth many millions of dollars.

So when we say that the key to the future is to learn how to use your judgment to create knowledge blocks, we are referring to intellectual assets that can be worth many millions of dollars. Why then do we find that people fill up their day with repetitive activities rather than use their brain to create knowledge blocks? In trying to answer this question, we came up with the thought that the sport of golf may be able to provide us with some insight.

The most successful golf professionals say that there are two aspects of the sport of golf. First, there is shot-making and second, there is the strategic or thinking side of the sport. They also say that many golfers have excellent shot-making skills but it is really the strategic side of golf that defines champions.

Most golfers practice shot-making and then play the sport repetitively. They spend little or no time mastering the strategic side of their sport. This is further evidenced by the fact that there is very little definitive literature about the strategic or thinking aspects of the sport of golf other than to say it is important and to describe some of the strategic decisions that famous golfers have made to win major tournaments. There is even less record of the thought processes the best strategic golfers use to match their shot-making ability with the features of a golf course.

We have visions of Jack Nicklaus playing a practice round at Augusta National. He constantly refers to a notebook that contains his record of all sorts of data that he may need to help him make strategic decisions. Undoubtedly, his personal notebook contains his record of past club selections and results. Jack Nicklaus has tremendous shot-making and strategic skills but his notebook is his knowledge block. If his notebook is unintelligible to anyone but Jack, it is still worth a lot to him, but to everyone else it would have the worth of Jack Nicklaus memorabilia. If his notebook is extensive, such that it contains methods, systems, glossaries and formulas that can teach others to develop and even improve their strategic sense of the sport of golf, it is worth much more. If Jack's notebook also contains developed ideas concerning knowledge-based products and services that can be derived from the strategic methods and systems that he developed over the years, it would be worth even more. A notebook of that type would probably be worth many millions of dollars. And every formula found in this type of notebook would be based on Jack Nicklaus' judgment and knowledge.

What if Jack Nicklaus never kept a notebook, but a golf enthusiast spectator, who had never played a round of golf, went to every major tournament that Jack Nicklaus played in during his career and took meticulous notes. Then this spectator developed a planning system that he believed explained the strategic decisions that Jack Nicklaus made throughout his career. The spectator's notebook was his knowledge block. Imagine that Jack Nicklaus heard about the spectator's notebook from a reporter and asked to see it. After seeing the notebook, Jack Nicklaus was so impressed that he asked the spectator to sell it to him or to form a partnership to develop new businesses based on the notebook. Is the notebook worth less because someone other than Jack Nicklaus developed it?

Now imagine that a creative thinker studied Jack Nicklaus' published playing statistics, visited all of the courses that Jack Nicklaus played during his career and within six months developed a strategic planning system for the sport of golf that Jack Nicklaus wished he had developed. Is that knowledge block worth less because it was developed in six months?

Knowledge blocks have inherent worth and their value depends on structure, content and the utility of the knowledge blocks to others. The reputation of a famous person like Jack Nicklaus can add value but the basic value is in the knowledge block. Few people will ever have the reputation of Jack Nicklaus but everyone can create knowledge blocks that have inherent worth, first to them and second to others if they decide to share or sell their knowledge blocks.

We believe that the reason people spend so little time creating their own knowledge blocks is that very little has been written to teach them how to do it. Consequently, people do what they are accustomed to doing. They perform their skills repetitively. We believe that the reason most golfers take the strategic side of the sport for granted is that they don't have a system to help them create and use their own knowledge blocks.

Our goals for writing this book are to:

1. Provide average golfers of all ages with a system that enables them to understand, improve and enjoy the strategic side of their sport, and
2. Show that the strategic principles that they use to improve the strategic side of their sport can also be valuable in the business world.

Chapter 1: Golf Course Assessment

As well as being the playing field for the sport of golf, golf courses are living 3-dimensional works of art that combine science, technology, and strategic thought into 18 masterful, changing puzzles that must be solved every time a golfer plays a round of golf. Golfers solve a course's 18 puzzles by developing strategies that best match their shot-making ability with the challenges that have been built into the course by the architect and maintained in playing condition by the golf course superintendent. To solve these puzzles proficiently, golfers would benefit if they created certain knowledge blocks and used them to form a system that facilitates their strategic thinking.

Understanding the features that golf course architects build into a course is the first knowledge block that golfers ought to create if they wish to master the strategic side of golf. Just as in business, people can spend years playing golf on their home course without ever recording their thoughts and then expect to instantly remember their experiences whenever they get into a tight situation. Jack Nicklaus found it necessary to write his thoughts down so that he could use them as a reference the next time he played a round of golf and so should the rest of us.

Chapter 1, which explains golf course features, has been written to provide golfers with a reference manual. This chapter also includes a mechanism to facilitate the recording of a golfer's judgment concerning the importance of each feature to his/her shot-making skill. This is what is meant by a golfer's strategic assessment of a golf course. Another way to describe your strategic assessment of a golf course is to say that it represents your golf course features knowledge block. Completing a strategic assessment of your home course will give you a taste of how to prepare a strategic assessment of any subject. A complete structure, including a glossary of all terms is necessary and our system requires that your judgment must be entered into the structure with a mathematical language. As a result of this procedure, your golf course features knowledge block is prepared.

Golf is a complex sport that teaches many principles that are directly applicable to a lot of life's challenges. We teach that mathematics is the essential strategic thinking language. Just as for any subject, without mathematics, the strategic or thinking side of the sport of golf can't be adequately developed. The best golf thinkers carry their strategic plan for the course with them during a tournament and constantly refer to it, and these plans aren't simple; neither should your plan for golf or business be simple. It is our opinion that mathematics is the only language that can effectively communicate judgment. We believe that mathematics is not only important, but it is also essential that mathematics be used to create useful knowledge blocks.

Chapter 2: Skill and Equipment

The two principle parts of the sport of golf are shot-making and strategy and both parts require skill and equipment. Shot-making is concerned with the skill of using equipment and strategy deals with the skill of using the results of shot-making to solve 18 puzzles designed by the golf course architect. The chapter on skill and equipment provides instruction concerning how to prepare your shot-making knowledge block.

In Chapter 2, golfers are introduced to the concept of a target plane and landing zone. Both planes emerge from **Line (A)**, which is the perpendicular drawn from the ball to line (B). **Line (B)** is the line that is closest to your toes and parallel to your target line. To visualize the target plane, it is suggested that you imagine that line (A) represents a slit in the ground, under which there is a spring loaded bolt of ribbon, with a width equal to the length of line (A). As your shoulders and body turn during your backswing, the ribbon is unwound from the bolt. Unless the ribbon is taken straight back and low to the ground to form a plane before it is brought over your shoulders by your extended arms, the ribbon will either jam the bolt, drape over your shoulders or become entangled. On the downswing, your shoulders and body reverse themselves and the ribbon goes back into the ground, as long as it is not tangled during the backswing or downswing. The sensation that you will feel, as the clubhead returns to its initial position and then through the ball in the direction of your target line, is that your shoulders remain parallel to the line of flight for quite awhile. This enables you to cast the entire ribbon towards your landing zone. After that happens, the ribbon is released from the ground and clubhead. Your extension allows your shoulders and body to complete their turn as you finish your follow-through.

Plane (1) is the initial length of ribbon formed as it is unwound from the bolt by your backswing. Plane (1) returns into the ground on your downswing. Plane (2) is formed when the entire ribbon is cast in the direction of your intended line of flight to your target landing zone.

The concept of a plane awakens golfers to the fact that, by definition, a plane includes all straight and curved lines found within it. This naturally leads to the concept of a landing zone versus a spot. Professional golfers realize that no two shots from the same position and under the same conditions will be exactly alike. This is because the target plane has numerous straight and curved lines, many of which move away from the target line. It should be obvious that there is a relationship between distance and the size of the landing zone for each club.

Golfers are then instructed to prepare landing zone tables for their irons and woods that represent their own shot-making ability. For convenience, these tables are separated into the golfer's landing zone tables for Power, Average and Placement shots. These tables are part of your shot-making knowledge blocks. They contain distances, landing zones and probabilities.

Professional golfers have such shot-making ability that they can consider any and all shots; even so, it is suspected that strategic thinking is the differentiating factor. Average golfers have a much smaller shot-making repertoire than professional golfers; consequently, strategic thinking is even more important. It is not unrealistic to expect that mastering the strategic aspects of golf can help professionals improve their average score by 0.5 strokes. Average golfers (18 handicap) will probably be able to improve their score by 10 strokes; good golfers (8 handicap) should be able to improve their score by 5 strokes and near scratch golfers (3 handicap) by 1 or 2 strokes.

Learning how to prepare and use knowledge blocks to improve your strategic sense of the sport of golf is also expected to improve most golfers' shot-making ability. This is because golfers will learn that score depends on distance, trajectory, landing zone and strategy. When golfers realize that new strategies open up whenever they are able to shrink their landing zone for specific clubs, they will begin to practice placement and power control golf. In addition, they will develop a keen understanding of their own shot-making ability and be less likely to be lured by the golf course architect or other golfers to select strategies that are beyond their ability. Prescription golf will fade away as golfers learn to take control of their own sport and use their shot-making ability to solve the 18 puzzles designed by the golf course architect.

Prescription golf means being guided by what someone else believes you should accomplish. This leads to abdication of a golfer's strategic responsibility. All golfers are urged to recall their shot-making ability and honestly prepare their own shot-making knowledge blocks. This thought also carries over to the business world. Prescription business decisions mean being guided by what someone else believes you should accomplish without ever preparing and learning to use your own knowledge blocks.

The premise of the chapter on skill and equipment is that golf score is determined by distance, trajectory, landing zone, and strategy. Shot-making skill controls distance, trajectory and landing zone. Strategy assesses probabilities and objectively determines the route on each hole that best utilizes the golfer's shot-making ability to solve the architect's puzzles.

Jack Nicklaus gives the following advice about shot-making:¹: *“The reason you don't play as well as the tour pros isn't that you can't ever hit a good shot. Everybody who breaks 90 sometimes hits shots as good as me or any other pro, even though maybe only once in a great while. Obviously, these super shots aren't your problem - but neither, in one sense, are your absolutely diabolical shots. Your problem, at your level of golf, is the enormous gap between your best shots and your worst shots. If you could close that gap even a little bit, your golf scores would improve out of all recognition.”*

The skill and equipment chapter takes this thought even further. It is not only that there is a gap between each golfer's worst and best shots but also that all golfers hit shots differently each time they swing a club. It is inescapable. Even precisely controlled golf swing machines don't strike the ball exactly the same every time a ball is hit. The slight difference becomes very apparent when the ball finally stops a considerable distance from where it began. Golfers would do well to recognize that everybody hits the ball differently each time they swing a club and take their own shot variances into consideration.

Most people should be able to become scratch golfers on their home course by meticulously recording and paying attention to their shot-making statistics and becoming expert at the strategic side of golf as well as shot-making. It is also suggested that average intelligence is all that is required for anyone to master the strategic side of golf at a level that is comparable to the best professionals. To accomplish this, you must learn how to prepare and use your own knowledge blocks.

By completing a strategic evaluation of your course, you will not only develop a thorough understanding of golf course features but you should also form many thoughts about the 18 puzzles designed by the architect. You will probably update your course's yardage book or prepare one if there isn't any. You may even be able to sell it to other golfers if you do a good enough job. You will know where every feature is located on each hole and you will have the dimensions of each fairway and green. While instructing you to prepare a strategic assessment (golf course features knowledge block), it is stressed that you work through the paradigm of prescription golf by collecting your own thoughts and relying on your own judgment. In the chapter on skill and equipment you are instructed to prepare landing zone, roll, elevation and altitude tables. Again it is stressed that you recall your own shot-making ability. You are advised to understand your own ability and to use your own knowledge blocks to prepare your strategic plan for the course.

¹ Jack Nicklaus' *Playing Lessons*, ISBN 0-914178-42-3, Golf Digest Book, Distributed by Simon and Schuster, 1976

It is recommended that you study the shot-making skill of professionals to help you understand the shape of graphs that you will probably want to prepare for your own golf game.

The chapter on skill and equipment ends with the following thought. *“If the top tier of professional golfers have equivalent shot-making skills, the factor that differentiates winners from runners-up must be their strategic thinking ability. This hypothesis, if proven to be true, parallels much of our work within industry. The factor that will differentiate tomorrow’s leaders from runners-up will be the strategic thinking ability of the professional staff. Those companies that have people who learn to convert their know-how into knowledge blocks so that they can think everything through thoroughly will be tomorrow’s leaders.”*

Chapter 3: Shot-Making Notes

The most successful golf professionals say that there are two aspects of the sport of golf. First, there is shot-making and second, there is the strategic or thinking side of the sport. They also say that many golfers have excellent shot-making skills but it is really the strategic side of golf that defines champions. The two aspects of golf are inexorably linked together. Both aspects require golfers to develop their own skills. Every golfer must have both shot-making and strategic planning skills. Similarly to the business world and life in general, golfers must learn to develop their own strategic plan and hone their shot-making skills so that they are able to implement their plan.

“Shot-Making Notes.doc “is Roy’s personal file concerning shot-making. It is included in this book because it illustrates the power of note taking. We are firm believers that people should take notes about information that is important to them and the notes should be personalized. Think about this. Wouldn’t it have been a great benefit if you were handed a file of well written notes concerning data and events that were important to your predecessor when you were promoted? Also, if you are a golfer, wouldn’t it have been great to have received your father’s notes concerning golf lessons that he considered to be important?

While I was writing this note taking monograph, I wondered why so many people, read documents, absorb some information and then return, file or discard them, thinking that they can always be accessed at a later date if details are needed. Then I looked around my office and noticed stacks of “Golf” magazines and golf books. I realized at that moment that I had cluttered up my office with stacks of golf information because I felt that I might want to read some of the lessons again.

Then I reflected on my golf experiences throughout my life. I am now 73 years old and have been playing golf since I was 13 (60 years). When I was 16 years old I was a scratch golfer. In 2007 I have a 15 handicap. Wouldn’t it have been great if I had written down my thoughts and information that were important to me for the past 60 years?

I wondered why I hadn’t practiced what I preach. Then and there I decided that I would take the time to clean up my office and get rid of all of my golf information. If the magazines and books are important to me, I should take the time to write down my thoughts. This “Shot-Making Notes” chapter is the result of my effort.

We encourage readers to add to and edit the **“Shot-Making Notes.doc** “ file to make it their own and continue this practice for as long as they are able to play golf.

Chapter 4: Strategic Plans

To prepare a strategic plan for your course, you must understand all of the features designed into each hole by the architect and thoroughly and objectively analyze your shot-making ability. You will need your golf course features and shot-making knowledge blocks. The analysis of your shot-making ability should describe the distance, shape and area of your landing zone, based on past experience, for shots hit with each club in your golf bag. The landing zone for the first and subsequent shots is positioned on a schematic of each hole, developed with the aid of your golf course features knowledge block. Then two routes are evaluated at a time until the route is found that produces your lowest average score for each hole.

The chapter concerning the preparation of a strategic plan for your home course contains all of the forms instructions and examples necessary for you to prepare your strategic plan. As applied to the sport of golf, strategic refers to alternate routes for each hole that best utilize a golfer's shot-making ability to produce his/her lowest average score. The route that produces a golfer's lowest average score is his/her best strategic alternative. A principle to adapt is that luck is not strategic to a well thought out plan. Those who rely on luck can expect failure most of the time, mediocrity some of the time, and excellence none of the time.

In 1927, George Thomas Jr. gave us the following advice in his book, *Golf Architecture in America, Its Strategy and Construction:*² *"The strategy of the golf course is the soul of the sport. The spirit of golf is to dare a hazard, and by negotiating it reap a reward, while he who fears or declines the issue of the carry, has a longer or harder shot for his second; yet the player who avoids the unwise effort gains advantage over one who tries for more than in him lies, or who fails under the test. Golf is a sport of balance. The golfer who knows the value of each club, and who can work out when it is proper to play one and when to play another, succeeds at the sport. A thinker who gauges the true value of his shots, and is able to play them well, nearly always defeats an opponent who neglects to consider and properly discount his shortcomings. The ability of players to understand the simple strategy of a hole is undoubted, but too often they play blindly and do not consider their best lines. On other holes, where the strategy is more involved, the player does not so often discover his best line until the course is played several times."*

In 1990, Shunsuke Kato wrote in his book, *What Makes a Good Golf Course Good:*³ *"As to the question of wherein lies the meaning of making courses full of the strategic nature, I answer that the pleasure is doubled if you attack the course with full understanding of the design intention.....If the course has a strategic nature, the golfer will consider the intentions of the designer and will carry out flexible calculations, challenging at times and fleeing at other times. In the end result, this will give the golfer the pleasure of improving his skill. The designer is designing a course containing hazards and many twists and turns in order to have golfers enjoy the pleasure of mental play, which is the real pleasure of golf and which cannot be enjoyed on a course which requires only power."*

² Golf Architecture in America Its Strategy and Construction, George Thomas Jr., USGA 1990, A Facsimile of 1927 Edition, ISBN 0-941774-10-4, The Times-Mirror Press, 1927

³ What Makes a Good Golf Course Good by Shunsuke Kato, Ueno Shoten Publishing Co. 1990, ISBN 4-7952-7205-0 C3050 P32000E

When asked, what makes a course great, Robert Trent Jones ⁴ said that Bobby Jones had perhaps the best definition. Bobby Jones believed *“A great course must be a source of pleasure to the greatest number of players and that it require strategy, the use of the mind, as well as skill, the God-given use of the muscles. If it lacked these aspects, it could not continue to hold the player’s interest.”* Jones also felt *“A course must give the average golfer a fair chance, at the same time demanding the utmost from the more skilled player.”*

Ben Hogan ⁵ said *“A good golf hole should have both character and appeal. It shouldn’t ask a golfer to play shots that are beyond his ability, but it should present him with an interesting challenge and reward him when he hits the shots that are called for. Golf is a sport in which you play your first shot on a hole in order to play your second from the best position, and so on. It’s a thinking sport, a sport of controlling the ball.”*

Structure, focus and confidence are the conditions required for people to make judgments count. The chapter on strategic planning ties everything together to give you structure and focus for your thinking. The instructive material provided is intended to give you the confidence to master and enjoy the strategic side of golf.

Chapter 4 also includes my strategic plan for the Passaic County Blue Course, which is one of the 100 oldest courses in America. This strategic plan serves as an example of a strategic plan for a golf course.

Chapter 5: Colonel Bogey

Colonel Bogey is a fictitious amateur golfer, who is described in Chapter 5.

Colonel Bogey’s strategic plan for his once-in-a-lifetime golfing trip to St. Andrews is presented in eighteen sections (one for each hole). Colonel Bogey developed two plans for each hole so that he could learn the difference that he might expect if he played the course in an aggressive prescriptive manner or a thinking manner based on his own abilities.

Since Colonel Bogey was only going to play the course once, the only way that he could answer his questions was to play the course mentally many times. Actually, he could play the course mentally as many times as he wanted. And when he came back from St. Andrews with his own electronic photographs, he could play the course over and over again to improve his own game. And when he practiced his golf swing at the driving range, he could mentally play “The Old Course” at St. Andrews.

The same principles hold true for creating a new product for an existing or new-to-the-company market. Chapter 7 (The Market Value System) discusses how to mentally become a future market before you enter the market. It is our opinion that the process of industrial innovation is very similar to the processes that people use to mentally solve the sport of golf’s 18 complex puzzles.

What a great way to prepare for a once in a lifetime golfing trip. What a great way to prepare for entering a new market. Doesn’t it make sense to thoroughly prepare for a major event? We believe that this type of preparation can increase the enjoyment and confidence that you will experience when you play golf on any resort or famous course. This type of planning can also increase the enjoyment and confidence that you will experience in business when you create and launch a new product for an existing or new-to-the-company market.

⁴ “Golf by Design,” Robert Trent Jones Jr., ISBN 0-316-47298-0, 1993 Little, Brown & Company Ltd.

⁵ Ben Hogan’s Power Golf, Copyright© 1948, A. S. Barnes and Company, Inc.

Chapter 6: Spectator Golf

Golf has become a spectator sport because of TV and the excellent planning and execution that the PGA does for each tournament.

Spectators include those who:

- Are interested in the sport of golf,
- Like to attend golf tournaments,
- Like to view telecasts of golf tournaments,
- Like the strategic (thinking) aspects of the sport of golf,
- Like to mentally play the sport of golf,
- Want to learn how to solve complex puzzles,
- Want to learn how to develop new businesses, and
- Want to learn about the Market Value System.

Spectators can appreciate the shot-making skill of professional golfers and in that sense derive some enjoyment; but when you observe someone else taking a golf shot, you are not physically experiencing it. Spectators can also learn how to mentally play the game of golf and in so doing, improve their thinking ability to solve many of life's puzzles. Also, the strategic or thinking aspects of the sport of golf can be fully enjoyed whether or not you are physically able to play the sport. Spectators can and should develop strategic plans for their favorite golfers and then match their plans with the professionals' playing records during a tournament to decipher brilliant strategic decisions as well as blunders.

This is consistent with other spectator sports such as baseball, football and soccer. Sports enthusiasts come to baseball and football stadiums with some vision of a plan for their favorite team. Strategic errors are quickly recognized. Of course, a strategic decision that produces the desired result is considered brilliant. If the same decision fails, it is considered a blunder. Over the long haul, strategic decisions that are based on knowledge blocks will be brilliant far more times than they will be blunders. This is an important point to learn. People should only base important (strategic) decisions on knowledge blocks. First of all, knowledge blocks have inherent worth and secondly management and peers will not criticize decisions that are based on a solid foundation.

Chapter 6 Spectator Golf discusses:

1. PGA Tour Statistics,
2. PGA Tour Skill Ratings,
3. Official World Golf Ranking on April 1, 2007,
4. Major Champions (Grand Totals),
5. Golf Tournament Telecasts, and
6. Golf Tournament Attendance.

Chapter 7: The Market Value System

As previously mentioned, one of the primary goals of this book is to give you thinking aids and a reference manual that helps you get as much enjoyment from the strategic side of golf as the enjoyment you already experience from shot-making. We suggest that golfers, who learn to improve their thinking ability, will also dramatically improve their score.

We also felt that a successful book about the strategic side of golf would introduce strategic thinking principles that ought to be valuable in the business world. After all, if strategic thinking can help people increase their enjoyment of the sport of golf, while also improving their score, shouldn't the same principles help people increase their enjoyment of business while also improving profitability? Hence, a chapter about the Market Value System is included.

Jack Nicklaus, Golf's most proficient strategic thinker said: *"Golf calls for two interrelated but distinct skills. One is the ability to strike the ball, to physically play the shots. The other is the ability to observe, evaluate, plan and think your way around the golf course, to play strategically and tactically - in short, to score. No matter how good you become at the first, you'll never be a successful golfer if you are not equally good at the second."*

The key thoughts of this statement also apply to business. *"Business calls for two interrelated but distinct skills. One is the ability to create products and services. The other is the ability to observe, evaluate, plan and think your way around the market, to play strategically and tactically - in short, to be among the market value leaders. No matter how good you become at the first, you'll never be successful in business if you are not equally good at the second."*

The Market Value System enables people to prepare knowledge blocks that help them understand past, present and future market value so thoroughly that they can engineer products and services that will be required in the future and know that they will succeed because they have already experienced their mental success. In most respects, their mental or first creation is the more challenging and difficult work.

Market Value is defined as relative worth in terms of utility, quality, desirability or importance to the customer. End-product properties, economic value and influence can be linked together in an algorithm that correlates with historical market share and during the past 23 years has been used effectively to predict future market share and profitability.

Since market value is determined by consumer judgment or perception, the market value equation must be based on the judgment of people throughout the entire chain. When the complete market value equation has been developed, conversion curves are prepared to correlate components of the equation with technical and market parameters. In this manner, technology and market parameters are linked to long-term market value.

The same principle was used to develop the strategic planning system for the sport of golf. The strategic assessment of a golf course (Chapter 1) is based on your judgment of the importance of golf course features to your shot-making ability. The discussion of skill and equipment (Chapter 2) is based on your recollection or judgment of your shot-making statistics for each club in your bag. The strategic planning system (Chapter 3) provides you with a mechanism to think everything through very thoroughly to help you develop a plan that best matches your shot-making ability with the 18 puzzles the golf course architect has given you to solve.

Chapter 1 Golf Course Assessment

As well as being the playing field for the sport of golf, golf courses are living 3-dimensional works of art that combine science, technology, and strategic thought into 18 masterful, changing puzzles that must be solved every time a golfer plays a round of golf. Golfers solve a course's 18 puzzles by developing strategies that best match their shot-making ability with the challenges that have been built into the course by the architect and maintained in playing condition by the golf course superintendent. The two principal parts of the sport of golf are shot-making and strategy.

All sorts of books, magazines, manuals, video tapes, devices and golf schools are available to teach people the artistry and science of shot-making. However, there has been very little written about the strategic side of the sport of golf. This is one of the main reasons we decided to write a book about strategic golf. Although Roy has played the sport of golf for 60 years and has been privileged to play on many famous courses, he recently told me that, as a result of writing this book, he realizes that he never even partially appreciated the artistry that architects build into their golf courses. As he conducted the research we needed to write this book on golf strategy, he sent me a number of notes in which he voiced variations of the following thought. *"I am in awe of the talent and artistry demonstrated by golf course architects. I only hope that we can develop a system that helps golfers and spectators appreciate the features of golf courses and the strategic decisions required to play and enjoy the sport of golf."*

It took eight years of planning and two years of construction for Charles Blair Macdonald to build The National Golf Links of America, which opened in 1909. To plan his masterpiece, Macdonald visited most of the great courses throughout the world to gain experience. He also talked to the most accomplished golf professionals at that time. Macdonald meticulously prepared himself and then spared no expense in constructing a course that forced golfers to match their shot-making skill with the routes and defenses he built into each hole. Today, it still takes leading golf course architects a couple of years to design a championship course and then another two years to construct the course. It can then take the better part of a decade for the course to mature.

Nevertheless, most golfers are only on a golf course for the 4-5 hours required to play a round of golf; after which they know that the golf course was both beautiful and challenging, but to say that they fully appreciated the features that the architect built into each hole would be an overstatement. Most golfers' experience (with respect to features and strategy) on a course is closer to multiples of single visits than know-how that builds over time. We think that this is because a mechanism has never been designed to enable golfers to practice and improve their strategic thinking and appreciation of golf course architecture.

Many golfers spend time on the practice tee to hone their shot-making skills before a round and then again after a round to correct their shot-making errors. Few golfers spend time at their desk before approaching a course to develop a strategic plan that matches their shot-making ability with routes and defenses built into each hole by the architect. And most golfers play hundreds of rounds on their home course without ever preparing a single strategic plan. Hence, the strategic side of golf is largely taken for granted and left to shot-by-shot decisions that golfers make during each round.

Golfers also face barriers to effective strategic thinking because course and equipment ratings are based on shot-making methods and playing statistics prescribed by professionals. Much too much emphasis is placed on prescribed methods of play and target standards that only become applicable after golfers achieve a high level of shot-making ability. By the time they reach a high shot-making level, golfers have gained little or no experience in matching their own shot-making skill to the 18 puzzles designed by the architect. Consequently, they have established a paradigm for themselves that emphasizes shot-making and reduces the strategic side of golf to a prescription.

This book has been written to awaken readers to the challenges of the strategic side of golf. Ultimately, we want to provide readers with the mechanism that makes the strategic side of golf as interesting and challenging as shot-making. Improved strategic thinking is expected to give readers insight into shot-making improvements so as to make more advanced strategies possible for specific holes. Combining strategic focus with practice should have an immediate affect on score and everyone's enjoyment of the sport of golf.

Strategic Assessment of Golf Course Features

Strategic means "of great importance." If the objective of the sport of golf is for golfers to match their own shot-making skill to the 18 puzzles designed by the architect, then strategic ought to refer to the individual golfer. In order to complete a strategic assessment of golf course features (golf course features knowledge block), golfers must understand all of the features used by architects and assign weights to the features according to the importance that each feature has to their own understanding of the sport of golf. It is another question to ask professional golfers to tell us what they think is strategic to the sport of golf or for evaluators to rate the playing difficulty of different courses. The answers to these latter questions strengthen the paradigm that causes golfers to follow prescriptions for the sport of golf and to leave strategic thinking to others or to chance.

A strategic assessment is much different than the "**Slope System,**" which was implemented by the USGA on January 1, 1987 to address the problem of portability of handicaps. Prior to the Slope System, golf courses were rated only for the scratch golfer, with no consideration given to average or higher handicapped golfers. Today, the Slope System attempts to take into account the factors that affect the playing difficulty of a course.

The USGA stresses that accuracy and consistency are the keys to effective course rating and has developed a rigorous system to ensure that every rating meets these standards. Each course is accurately measured by a team of trained evaluators, and the measured yardage is corrected for factors that affect playing length. These factors are: roll, changes in elevation, forced lay-ups, doglegs, prevailing wind and altitude. Obstacles that affect playing difficulty are then evaluated by the trained evaluation team in accordance with established standards. The obstacles that affect playing difficulty are: topography, fairway, green target, recoverability and rough, bunkers, out-of-bounds and extreme rough, water hazards, trees, green surface and psychological factors. The results of this evaluation are slope and course ratings that allow golfers with handicaps determined on courses of different playing difficulty to compete with each other on any rated course.

The USGA Course Rating System Manual⁶ describes in detail the method used by a trained evaluation team to determine slopes and course ratings for courses of different length and playing difficulty. The equations that are used to determine Course and Slope Ratings follow:

1. Effective Length Correction

- a) Roll Length = Roll Total × 3.5
- b) Elevation Length = Elevation Total × 0.23
- c) Dogleg/Forced Lay-up = All adjustments are added to determine scratch and bogey effective length correction.
- d) Prevailing Wind = Wind Total × 6
- e) Altitude Length = (N × 250 [210] × (-0.07) × Altitude) ÷ 5000
- f) Short Course Effective Playing Length = (0.633 × measured length) + 1760

2. Yardage Rating

- a) Scratch Yardage Rating (Men) = Scratch EPL ÷ 220 + 40.9
- b) Bogey Yardage Rating (Men) = Bogey EPL ÷ 160 + 50.7
- c) Scratch Yardage Rating (Women) = Scratch EPL ÷ 180 + 40.1
- d) Bogey Yardage Rating (Women) = Bogey EPL ÷ 120 + 51.3

3. Obstacle Stroke Value

- a) Some obstacle factors have more impact on scoring than others. The relative importance of each factor is shown in the table below.

Obstacle	Weights of Obstacle Factors			
	Scratch Golfer		Bogey Golfer	
	Par 4/5	Par 3	Par 4/5	Par 3
Topography	0.10	0.08	0.12	0.08
Fairway	0.11	0.00	0.09	0.00
Green Target	0.09	0.09	0.06	0.07
Recoverability and Rough	0.14	0.13	0.15	0.13
Bunkers	0.07	0.06	0.10	0.10
Out-of-bounds/Extreme Rough	0.10	0.08	0.09	0.07
Water Hazards	0.14	0.13	0.14	0.11
Trees	0.09	0.07	0.14	0.11
Green Surface	0.11	0.11	0.08	0.09
Psychological	0.05	0.05	0.03	0.04
Total	1.00	0.80	1.00	0.80

- b) Scratch obstacle stroke value = Sum of weighted scratch obstacles × 0.11 - 4.9
- c) Bogey obstacle stroke value = Sum of weighted bogey obstacles × 0.26 - 11.5

4. Course Rating and Slope Rating

- a) USGA CR_(men) = [SOSV_(men) + Scratch EPL_(men)] ÷ 220 + 40.9

⁶ <http://www.usga.org/home/index.html>

b) $USGA\ CR_{(women)} = [SOSV_{(women)} + Scratch\ EPL_{(women)}] \div 180 + 40.1$

c) $USGA\ BR_{(men)} = [BOSV_{(men)} + Bogey\ EPL_{(men)}] \div 160 + 50.7$

d) $USGA\ BR_{(women)} = [BOSV_{(women)} + Bogey\ EPL_{(women)}] \div 120 + 51.3$

e) $SLOPE_{(men)} = 5.381 \times (BR_{(men)} - CR_{(men)})$

f) $SLOPE_{(women)} = 4.240 \times (BR_{(women)} - CR_{(women)})$

These formulas may look difficult but they really are quite simple. The important thing to remember is that golfers don't have to know how to evaluate golf courses for the purposes of handicap portability. The only thing that they need to know is that the USGA has developed a system that works and controls its use to ensure fairness throughout the country. Therefore, these formulas are not strategic to most golfers. Course and Slope Ratings are calculated for golfers, as are the handicaps derived by applying these ratings to scores.

A USGA Course Rating is the evaluation of the playing difficulty of a course compared with other rated courses for the purpose of providing a uniform standard by which to compute USGA Handicap indexes. A USGA Course Rating is equal to the average of the better half of a scratch golfer's score under normal conditions.

A USGA Slope Rating reflects the relative difficulty of a course for players with USGA Handicap indexes above scratch, compared with the difficulty of the course for a scratch golfer. The average golfer receives more handicap strokes playing a course with a high Slope Rating than he does playing a course with a low Slope Rating. The standard USGA Slope Rating is 113.

Golfers do need to know how to prepare a strategic assessment of golf course features (golf course features knowledge block) so that they can use their shot-making ability to solve each of the 18 puzzles designed by the architect. And golfers must be astute enough to recognize and appreciate every feature used by the architect. The strategic assessment procedure that follows has been designed to provide golfers with a complete description of all features found on the world's most famous courses as they learn to actually complete their own strategic assessment.

There are 12 broad categories of features that architects use to design a course's 18 puzzles and each of these broad categories is explained by 5 or 6 sub-factors for a total of 63 sub-factors. All of the sub-factors aren't found on every course and within each course every hole is different. For example, it is impossible for a course to have ocean water hazards, when the course is not near an ocean; and the trees found on parkland and mountain courses aren't found on desert courses. The 12 major categories ⁷ of golf course features are:

⁷ "Golf by Design," Robert Trent Jones Jr., ISBN 0-316-47298-0, 1993 Little, Brown & Company Ltd.

Golf Course Features

1. Tee
2. Fairway Topography
3. Fairway Style
4. Fairway Grass
5. Outlying Area
6. Fairway Bunkers
7. Water Hazards
8. Green Complex
9. Green Design
10. Putting Surface
11. Wind
12. Psychological Features

The first step of a strategic assessment is to prepare an overall importance scale that ties all of the sub-factors together in a single model. The description of each sub-factor and the rating procedure that evaluates the sub-factors of the 12 major categories before the entire model is tied together, teach golfers about each feature before asking them to rate their importance from the perspective of their own shot-making ability. The initial scale is prepared by rating the importance of the 5 or 6 sub-factors that explain each of the 12 major categories irrespective of whether or not the sub-factor is found on the golfer’s home course. It is only necessary to prepare the importance scale once. It can then be used to prepare a strategic assessment of any course that a golfer plays in the future.

1. Tee

The tee is more than the section of land from which golfers begin their assault of the defense strategy built into the course by the architects and assisting golf professionals. The tee is not only part of the puzzle for each hole but also represents an opportunity for golfers to make last minute changes in strategy due to playing conditions or their position in a tournament or match. Golfers should be aware that each tee is the first position of defense that the architect can use to trick them into deviating from strategies that best match their shot-making skills with the puzzle to be solved. Just as in business, patience, courage derived from know-how, and a well thought out plan to solve the puzzle will win the day. The easiest way to succumb to the architect’s defenses is to stand on a tee without a strategic plan for the hole.

The sub-factors of Tee are: Route, Elevation, Location, Perimeter, Slope and Alignment.

1.1 Route

In the chesslike sport the golfer plays, early hazards in sight from the tee are meant to win the hole immediately for the architect. To defeat him, it is critical to understand his intent and decide on the best way to counter. Frequently, the architect relies on a golfer’s temptation and greed to cloud proper club selection on the tee. This is why route is included under the sub-factors of tee.

Route refers to a golfer’s strategic plan for the hole. To give a strategic assessment of route, a golfer must formulate a specific plan that matches his/her shot-making ability with the layout and features of the hole.

Route is considered difficult if more than one route is available and the predicted average score for each route is greater than par.

Route is considered average if more than one route is available and the predicted average score for one or more routes equals par.

Route is considered easy if more than one route is available and the predicted average score for one or more routes is less than par.

1.2 Elevation

Elevation of the tee has two important consequences. First, when a tee is positioned well above the fairway, the actual landing area becomes more difficult to determine due to increased distance obtained by the vertical drop. Second, the preferred landing area may be tighter because an errant shot will travel farther off line before landing.

When a tee is positioned below the elevation of the landing area, the rise in elevation from tee to fairway helps control errant shots because it stops the ball quickly. The focus should be on trajectory and carry for this type of tee shot. Psychologically, many players feel awkward and uncomfortable with the landing area above them and overswing.

Elevation is considered difficult when the tee is positioned well above or below the golfer's target landing area such that the golfer experiences indecision in club selection and power to be applied to the shot.

Elevation is considered average when the tee is positioned moderately above or below the golfer's target landing area such that the golfer experiences little or no indecision in club selection and power to be applied to the shot.

Elevation is considered easy when the tee is positioned slightly above the golfer's target landing area such that club selection and power to be applied is almost automatic.

1.3 Location

Another consideration is the tee location in relation to other features such as trees, rocks, bushes and edges of mountains, which may restrict a golfer's ability to judge the hole. Tees of this type, a) may give the golfer little or no view of the hole, b) may place the golfer in a controlled environment, which affords little information about prevailing wind conditions, and c) may give the golfer a false reading concerning how to place his/her tee shot.

Location is considered difficult if golfers have little or no view of the hole from the tee and are not able to judge prevailing wind conditions that may influence the trajectory of the ball.

Location is considered average if golfers are able to judge their landing area enroute to the tee from the previous green and if prevailing wind conditions are known to be mild.

Location is considered easy if golfers have a clear view of their target landing area and prevailing wind conditions are mild.

1.4 Perimeter

Perimeter refers to the outer edge of the tee. Golfers should be aware that the architect may have built a perimeter illusion into one or more golf tees to trick them into selecting a more risky direction and landing spot on the fairway or to cause them to have an improper stance on the tee.

Perimeter is considered difficult if it gives golfers little or no insight into their stance on the tee and if there are no other apparent points of reference.

Perimeter is considered average if it gives golfers little or no insight into their stance on the tee but there are other reliable references, such as an unblocked view of the hole, which golfers can use to judge their stance.

Perimeter is considered easy if the tee's perimeter gives golfers good insight into their stance on the tee.

1.5 Slope

Frequently, tees are tipped slightly to create drainage. Even this slight slope can affect the tee shot. Other slopes are intentionally put into the tee by the architect. For example, most architects will tip the tee in the direction of the proper shot on most holes and then design one tee that misleads a golfer.

Slope is considered difficult if it misleads golfers and causes them to have something other than a flat lie.

Slope is considered average if it causes golfers to have something other than a flat lie but doesn't mislead.

Slope is considered easy if it gives golfers a flat lie.

1.6 Alignment

Most of the time the architect has lined up the tee with the fairway; however, the architect may occasionally line up the tee so that it points diagonally across the fairway rather than the ideal target area. In addition, small tees (particularly on steep terrain) are shaped and aligned to the existing topography. The line from the tee to the center of golfers' target landing zone and its relationship to stance are important considerations. For example, a golfer's stance and center line will differ depending on whether the architect has positioned the tee, left, right or in the center of the fairway.

Alignment is difficult if the tee is not lined up in the direction of an ideal target area and if there is an illusion that hides this misalignment.

Alignment is average if it is apparent that the tee is not lined up in the direction of an ideal target area.

Alignment is easy if the tee is lined up in the direction of an ideal target area.

These six sub-factors explain The Tee. They are a check list of what to look for. Golfers may or may not consider them to be equally important. For example, golfers who have great difficulty with stance may consider alignment to be very important and consequently weight this sub-factor more than others. Golfers who have difficulty with elevation may give that sub-factor a greater weight. There isn't any right or wrong answer nor is there a prescription that tells you what to think. Mentally review each of the 6 sub-factors and assign points to each sub-factor according to its importance to your shot-making ability. The points assigned to the 6 sub-factors must total 1,000. If you consider the 6 sub-factors to be equally important assign 4 factors 167 points and 2 sub-factors 166 points.

We suggest that you read this chapter once and then read it again as you complete the ***Strategic Assessment of Golf Courses.xls*** model that you will find on the CD. We also suggest that you begin a notebook that you can use to keep track of your own thoughts.

- 1. The Tee**
- 1.1 Route**
- 1.2 Elevation**
- 1.3 Location**
- 1.4 Perimeter**
- 1.5 Slope**
- 1.6 Alignment**

	Importance
Total	1,000

A complete strategic assessment of “The Old Course” at St. Andrews is in Chapter 5 (Colonel Bogey) along with distance and landing zone tables for irons and woods plus a detailed 18-hole strategic plan for Colonel Bogey. You are encouraged to read the entire book and prepare your own strategic assessment and plan for your home course and then Chapter 5 again. Remember that it is important for your golfing success and pleasure that you take personal control of the strategic side of your golf game.

2. Fairway Topography

Topography concerns surface features of the fairway. All fairways have combinations of surface features. For strategic assessment of topography, golfers should consider the most prominent topographic feature of the fairway.

2.1 Flat

Flat fairways are difficult if they are narrow and if they are guarded by thick rough and/or wasteland.

Flat fairways are average if they have medium width and if they are guarded by medium rough and/or wasteland.

Flat fairways are easy if they are wide and unguarded by rough and/or wasteland.

2.2 Mounded

Fairway mounds are deployed like bunkers as a defense. As physical obstructions, mounds can kill an otherwise promising drive, deflect the ball into trouble, or leave golfers with a difficult downhill, sidehill, or uphill lie. As visual obstructions, mounds can block a golfer’s view of the target and create uncertainty. Situated in front of a green, they require a deft pitch to clear them and stop the ball quickly.

Mounded fairways are difficult if golfers are forced to accurately place their shots into relatively small safe landing areas and if the dimension and number of mounds cause golfers to consider the fairway to be sloped.

Mounded fairways are average if a route is available that enables golfers to hit full shots to safe landing areas and if the landing area dimension is large enough that golfers consider the fairway to be flat.

Mounded fairways are easy if the mounds only come into play after an errant shot.

2.3 Rolling

From a topographical viewpoint, rolling terrain affords numerous ups and downs. It allows an architect to create many types of undulation from swales to plateaus.

Rolling fairways are difficult if the target landing area usually involves an uphill, sidehill or downhill lie.

Rolling fairways are average if the valleys between the fairway rolls are such that golfers have a flat lie for their second shot thirty percent of the time.

Rolling fairways are easy if the valleys between the fairway rolls are such that golfers have a flat lie for their second shot sixty percent of the time.

2.4 Tilted

Tilted fairways cant sideways with some degree of sharpness. Golfers must estimate how much angle will be added to the shot after it hits the slope and judge stance for their next shot.

Tilted fairways are difficult if the slope is such that well hit drives, with certain trajectories, carom off the slope and roll off the fairway into an outlying area.

Tilted fairways are average if the slope is such that well hit drives safely stay on the fairway regardless of trajectory.

Tilted fairways are easy if the slope is such that most drives safely stay on the fairway regardless of trajectory.

2.5 Sloped

Sloped fairways have uphill and/or downhill sections that result in an uneven lie in the direction of the slope. Golfers must estimate the amount of roll and judge stance for their next shot.

Sloped fairways are difficult if the slope is such that the next shot must be hit from a severe uphill or downhill lie.

Sloped fairways are average if the slope is such that the next shot must be hit from a medium uphill or downhill lie.

Sloped fairways are easy if the slope is such that the next shot must be hit from a slight uphill or downhill lie.

These 5 sub-factors describe various types of fairway topography. Assign points to each type according to degree of difficulty. For example, if you consider flat to be the easiest and the other four types to be equal but about 30% more difficult than flat, you should assign 160 points to flat and 210 points to the other types of fairway topography. The points assigned to the 5 sub-factors of Fairway Topography must total 1,000

2. Fairway Topography	Importance
2.1 Flat	
2.2 Mounded	
2.3 Rolling	
2.4 Tilted	
2.5 Sloped	
Total	1,000

3. Fairway Style

Style concerns the way in which a fairway has been laid out by the architect.

3.1 Linear

This is the most common fairway style. Linear fairways flow in a straight line between tee and green and often provide golfers with a clear view of the entire hole. Degree of difficulty of linear fairways is proportional to width. Difficult linear fairways are narrow. Linear fairways that have significant characteristics of other important fairway styles should be judged according to the fairway's most distinguishing characteristics. For example, a linear corridored fairway that widens and narrows is either a corridored fairway or a widening – narrowing fairway depending on which style makes the hole more difficult. A linear fairway that requires a placement tee shot should be evaluated as an island fairway.

3.2 Corridored

Corridored fairways are usually tree-lined fairways. Trees act as a perceptual guide for golfers and also serve as a natural defense against shots that are misdirected or poorly struck. Corridored fairways can also be bordered by severe hazards such as linksland and desert wasteland. Narrow fairways with trouble on both sides of the fairway can be considered to be corridored fairways. Many amateur golfers frequently hit low drives that might roll 150 yards or more down a fairway in the direction that the ball was hit. If a drive of this type angles across the fairway into bushes or waist land, for that golfer the fairway is corridored. The goal of this chapter is to enable every golfer to complete a strategic assessment of a golf course that is matched to his/her shot-making ability.

Some corridored fairways have chutes, which consist of trees that are positioned such that they can intervene on the early flight path of a shot, and the ball must be hit through a narrow opening. Chutes are rated based on the width of the opening between the extending branches of the trees and how far that opening is from the teeing ground, or for a second shot from the first shot landing zone. Other factors to consider in rating chutes are the density of the foliage (Will a ball pass through the branches?), the area where a ball might drop if it strikes the trees, and how well the player can recover from that area. Degree of difficulty of corridored fairways is proportional to width of the fairway and the penal nature of the trees and/or other severe hazards.

3.3 Split

Split fairways are separated horizontally by a hazard or vertically by an elevation change. One segment of a fairway that is horizontally split usually offers golfers a superior position from which to attack the hole, but reaching it involves greater risk than shooting to the safer landing area. The other portion is less risky but results in a longer more difficult route to the final target. The area that separates the two fairways generally penalizes golfers in some way, with the severity depending on the type and design of the hazard utilized.

The second type of split fairway is vertically divided into two or more elevations generally tied together by severe slopes, causing most shots to finish in a reasonably level area. One side usually has a better angle of attack to the next target.

Degree of difficulty of split fairways is proportional to the width of each section and the penal nature of the hazards that divide horizontal fairways and the slopes that divide vertically divided fairways.

3.4 Island

Island fairways pose three basic challenges: 1) Hitting them is more a matter of direction than distance and there are severe penalties on their perimeters, 2) The preferred landing area is specific with additional trouble lurking beyond the prime landing area, and 3) not carrying the immediate obstacle results in severe penalties. Degree of difficulty of island fairways is proportional to distance, landing area dimension and the severity of hazards.

3.5 Dogleg

Architects use doglegs to hide the final target from golfers. On average, golfers can expect to see at least three or four pronounced dogleg holes in a round. The dogleg creates uncertainty about the amount of landing area off the tee, because neither the landing area nor the green can be seen.

Dogleg fairways are difficult when they involve multiple styles, topographies and strategic hazards to make golfers accurately place their shots. For example, a dogleg fairway that combines coridored and tilted legs is considered difficult by most golfers.

3.6 Widening - Narrowing

Fairways that widen and narrow are difficult when missing the opening to the landing area involves risk that is great enough to cause the golfer to change his/her club selection

Fairways that widen and narrow are average when the golfer feels confident that he/she is able to hit a full shot but an errant shot still involves risk.

Fairways that widen and narrow are easy when the golfer feels confident that he/she is able to hit a full shot and an errant shot only affects the position of the next shot.

The 6 sub-factors of Fairway Style describe the most important fairway styles used by architects. Actually, golf course architects build various aspects of all of these styles into fairways. Assign points according to degree of difficulty of these important fairway styles. The points assigned to the 6 sub-factors must total 1,000.

3. Fairway Style	Importance
3.1 Linear	[]
3.2 Corridored	[]
3.3 Split	[]
3.4 Island	[]
3.5 Dogleg	[]
3.6 Wide-Narrow	[]
Total	1,000

4. Fairway Grass

Architects select grasses and grass blends that will thrive in the course's particular environment. Bentgrass, bluegrass, fescuegrass, and ryegrass are the cool-climate grasses. Bermuda or kuchgrass, and zoysiagrass are the familiar warm-climate grasses. Kikuyugrass is a mild climate grass that plays similarly to bentgrass or fescuegrass. Firmness concerns the condition of the soil.

When the ball is resting on the fairway, the cool-climate grasses generally cause the ball to sit close to the ground. In this case, the ball will travel shorter distances because greater contact with the soil causes more clubhead resistance. This is commonly referred to as a tight or thin lie. Conversely, the warm-climate grasses generally cause the ball to sit up on top of the grass. In this case the ball carries farther because there is little or no clubhead resistance.

Fairway difficulty is proportional to grass length (longer cuts are more difficult) and firmness (the extremes of hardness and softness are more difficult). Fairway grass & firmness strategy has been structured according to course type. Golfers should be aware that a course can involve holes that fit the description of more than one type. For example a links course can have prairie and parkland like holes. Southern U. S. courses can involve holes that fit the description of all of the major course types.

In rating fairway grass, golfers should consider the condition of well maintained grass during peak growing seasons. The fairway grass of courses, within the same family or type of course, will have different strategic ratings since no two courses have identical, soil, drainage and climatic conditions.

4.1 Links Course

Linksland is the sandy, undulating hills or dunes formed along a coastline by wind and waves. Consequently, links holes lack apparent definition. The tremendous openness of the seaside setting does not provide natural markers, such as trees and hills that golfers rely on to judge distance. The effect is certain disorientation. Links holes have an irregular quality about them. As you walk them, your feet feel the many bumps and rolls. The hidden swales reveal more contour than expected. The ground is traditionally firm; sharp bounces are common, and tiny pot bunkers are excruciating.

Links holes feature indigenous fescue grass. There are two basic types: fine fescue, which is the thinner version and tall or wild fescue, which has thick, coarse leaf blades. Fine fescue provides firm, tight lies, causing shots to travel shortened distances. Fescue rough tends to be swirly and light, and playing out of it generally is fairly easy due to its light clubhead resistance.

Links holes rely heavily on wind to provide part of the challenge. Success on seaside holes often depends on your ability to gauge winds. Good players actually try to bank shots off crosswinds, like a pilot angling a plane during a crosswind landing. The effective distance into the wind on a given hole often leaves newcomers incredulous.

The difficulty of linksland fairways depends on climatic conditions and the necessity to place shots. Placement shots to dry fairway landing areas under windy conditions and heroic carries under windy conditions are the most difficult.

4.2 Prairie Course

Prairie courses are cousins to inland heath courses, which were offshoots of the original linksland courses. Prairie holes are susceptible to fierce winds from different directions and prairie holes may have looming horizons, which influence perception. Prairie holes are subject to radical and surprising changes, ranging from sudden, sharp winds, cold spells, severe thunderstorms, and tornadoes, to searing debilitating heat.

Similarly to linksland, the difficulty of prairie fairways depends on climatic conditions and the necessity to place shots. Placement shots to dry fairway landing areas under windy conditions and heroic carries under windy conditions are the most difficult.

4.3 Parkland Course

One significant factor on a parkland course is the character of the wind, which is usually a zephyr, as contrasted with a gusty seaside breeze. When the woods are cleared to create fairways, some pockets are left that amplify and redirect the wind with a boomerang effect, causing it to swirl and making it difficult to judge distance and determine ball movement along a flight path.

Grasses frequently are heavy and lush. On the downside, because of clay soil, more moisture, and sodden turf, there is less roll, especially in the rough. Fairways frequently are sweeping, with rolling character. Rolling slopes force the golfer to consider intended landing areas carefully because shots frequently finish on sidehill angles or roll into unforeseen difficulties. Gauging roll accurately is important. Parkland fairway difficulty is more dependent on grass length and ground firmness than climatic conditions.

4.4 Desert Course

Due to the sandy composition of the soil, desert fairways and greens are very firm and because of intense sunlight and irrigation there is healthy growth of turf grass, which can be tightly manicured. Together, these factors result in extra bounce and roll, thus increasing distance. In general it is more difficult to stop the ball on the greens of desert courses. Where water for irrigation is scarce, architects are often forced into creating tight, narrow courses. These constraints are heightened by the fact that desert rough and transition areas are difficult to recover from. Areas off the fairways of desert courses contain native vegetation.

Desert sun produces an intensity of light and shadow that can distort perception and the shimmering heat sometimes creates a mirage effect. The warm air is usually still, dry and thin which results in more distance. Some holes may have cold air pockets that can deaden shots in the early morning or twilight hours. Desert fairway difficulty is dependent on time of the day and grass length. Ground firmness and climatic conditions are generally more predictable, except in a rainy season.

4.5 Mountain Course

Mountain courses feature dramatic changes in elevation and often give players the feeling of negotiating a slalom course. These courses require position and clear thinking. Because of the topography, many holes are routed through narrow canyons and accuracy is a must. Mountains mean twisting crystalline streams and most architects try to integrate them into the routing. Situated at heights, mountain courses can produce a loss of balance, which produces vertigo. The added elevation means thinner air and shots will travel farther. Deception is severe at mountain courses, which means that things are not as they seem. Mountain fairway difficulty is dependent on seasonal grass length and ground firmness.

4.6 Tropical Course

In many tropical areas trade winds affect the design of holes. Lush vegetation forces architects to use special techniques for routing holes. It also changes the composition of grasses and the way the ball plays off them. Kuchgrass, elephant grass and zoysia can be as tough as wire brushes. Many jungles grow on mountains, so courses built here combine mountain and jungle environments.

Jungle environments conceal dangerous obstacles and maintenance on tropical courses is often very difficult. Grass can grow uncontrollably and sporadically in these regions, causing a variety of lies. Tropical fairway difficulty is dependent on grass length and ground firmness.

Fairway grass has been subdivided into types that are found in different geographic and climatic regions throughout the world. Most golfers, who have had the chance to play golf on different types of courses, recognize that the fairway grasses are not of equal difficulty. The difference in fairway grass is one of the reasons why golfers score better or worse when they have the opportunity to play different types of courses despite seemingly similar course and slope ratings. Assign points to the 6 golf course types according to your judgment of degree of fairway grass difficulty. The 6 golf course types must total 1,000.

4. Fairway Grass

- 4.1 Links Course
- 4.2 Prairie Course
- 4.3 Parkland Course
- 4.4 Desert Course
- 4.5 Mountain Course
- 4.6 Tropical Course

	Importance
Total	1,000

5. Outlying Area

Outlying area refers to the terrain, features and hazards that boarder a fairway.

5.1 Rough

Architects use rough in two ways. First, in open areas, where there is little definition by other natural features, rough defines a hole and penalizes errant or misguided shots. Second, architects use rough as a protective buffer or saving device. Rough can be high and thick enough to keep the ball from encountering even worse trouble such as a lake, stream or bunker. Sometimes architects use different grasses to provide the golfer with a visual roadmap to the green. Understanding the way rough has been cut is vital to escaping from it. For example, if the first cut of rough has been mowed from green to tee, the grass will lie against the golfer and if the grass has been mowed from tee to green, the grass will lie with the golfer.

Fliers are caused when at impact a small amount of grass gets caught between the ball and clubface, with two consequences: 1) it shuts the clubface slightly, reducing loft on the club and thus increasing distance, and 2) the grooves on the clubface will not be able to impart spin to the ball, causing the golfer to lose distance control. Wet grass produces similar results. If at impact there is a substantial amount of grass between the clubface and the ball, the opposite effect of a flier will result. In this case the ball will travel a much shorter distance than normally.

Extreme rough is unmown cool season rough grass in excess of 6 inches in length, {4 inches in warm seasons}, {5 inches for women in cool seasons}, and {3 inches for women in warm seasons}, which makes it likely the ball will be advanced only with great difficulty. Rough can be among the more difficult hazards to escape from. Rough difficulty is related to grass type, blade direction and length.

5.2 Trees

Trees are a strategic design feature of parkland, mountain and tropical courses. In addition, trees determine the type of underbrush that is found in the area outlying the fairway. On the plus side, trees act as perceptual guides for players but they can also be penal hazards. Trees can also obscure vision and hide other features of a course.

The important thing for golfers to determine when facing a tree or group of trees is whether a slightly mishit or misaligned shot may strike them or end up under or behind one of them in a position that will substantially impede the next shot. If this is the case, the trees should be considered a hazard. Thick bushes that are found on some linksland, tropical and desert courses should be evaluated as trees.

The rating for trees and bushes depends on their size and density, their distance from the center of the fairway or green, the difficulty of recovering, and the length of the hole. Bushes, palmettos, gorse, cacti, scrub oak, etc., are like trees when their height exceeds about 3-4 feet. Because trees present golfers with 3-dimensional challenges, they require a much more complex shot-selection process. Degree of difficulty is related to size, number and placement of the trees that are within or boarder the fairway.

5.3 Underbrush

Underbrush refers to the natural growth beneath trees and bushes, which are within or line the fairway. Underbrush can range from a thick covering of leaves and thicket, which frequently results in unplayable lies and lost balls, to short grasses that are more forgiving than rough. In desert areas, underbrush can be similar to expansive wasteland. Underbrush difficulty is directly related to the nature of the underbrush.

5.4 Wasteland

Not to be confused with the waste bunker but closely related are what architects term waste areas or wasteland. They feature combinations of sand, native grasses, natural vegetation and, occasionally, other indigenous plants. Modern architects are incorporating grass swales and hollows into their courses. These hazards aren't as visible as sand and often result in awkward stances and lies making them more penal than sand hazards. Wasteland difficulty is directly related to the nature of the wasteland.

5.5 Out-of-Bounds

Definition 21 in the rules of golf defines out-of-bounds as follows: *“When out-of-bounds is fixed by stakes or a fence, the out-of-bounds line is determined by the nearest inside points of the stakes or fence posts at ground level; the line is deemed to extend vertically upwards. When out-of-bounds is fixed by a line on the ground, the line itself is out-of-bounds. A ball is out-of-bounds when all of it lies out-of-bounds.”*

Rule 29 in the rules of golf stipulates the penalty for out-of-bounds. *“If a ball be lost outside a water hazard or be out-of-bounds, the player shall play his/her next stroke as nearly as possible at the spot from which the original ball was played or moved by him/her, adding a penalty stroke to his/her score for the hole. If the original stroke was played from the teeing ground, a ball may be teed anywhere within the teeing ground; if from through the green or a hazard, it shall be dropped; if on the putting green, it shall be placed.”*

Out-of-bounds is a severe hazard resulting in a penalty stroke plus loss of the shot's stroke and distance. Most holes do not have out-of-bounds. Out-of-bounds difficulty is related to the likelihood of the out-of-bounds coming into play.

The 5 sub-factors of Fairway Outlying Area describe this broad category. Mentally position yourself in each of the outlying areas and assign points according to degree of difficulty. The points that you assign to each sub-factor enable you to compare them. Later on you will be able to judge all of the fairway outlying areas for specific holes but now you are just being asked to compare them. The 5 sub-factors of Fairway Outlying Area must total 1,000.

5. Fairway Outlying Area	Importance
5.1 Rough	
5.2 Trees	
5.3 Underbrush	
5.4 Wasteland	
5.5 Out-of-bounds	
Total	1,000

6. Fairway Bunkers

Bunkers are divided into “fairway” or “greenside,” according to where they are found on a hole. Fairway bunkers are generally larger and shallower in order to trap a full shot but to still allow some chance of reaching the green with a perfectly struck shot. Bobby Jones, Alister Mackenzie and Robert Trent Jones espoused the philosophy that bunkers should be located beyond the beginning golfer’s reach but in play for intermediate and expert players alike from their respective tees. Architects strategically place bunkers in relation to a hole’s multiple teeing areas. The key to proper bunker design is not how many but where the bunkers are positioned. Often, one thoughtfully placed bunker in a prime landing or approach area is all that is required to challenge most golfers, upset their rhythm, or help them visualize the proper way to attack a hole.

There are three general types of bunkers: 1) Those on an elevation, with sand flashed up against their forward face; 2) Those in hollows with faces and sand only at the bottom; 3) Those on an elevation or in hollows with rough as the playing surface instead of sand.

The size of the bunkers and their proximity to target areas is considered as well as the number of bunkers. Bunkers that reduce the size of the landing zone on the tee shot and the approach to the green are considered difficult. The difficulty of recovering from the bunkers is also a consideration. Fairway bunkers with compacted sand are much easier to play from than those with soft, fluffy sand; and bunkers with no lips or front banks offer much easier recovery than those with lips and severe faces.

Bunkers that closely border the green or fairway landing zone are within 5 yards of the green or fairway landing zone. Bunkers within 20 yards of the landing zone are considered to be near the landing zone.

6.1 Bunker Type

Robert Trent Jones Jr. discusses seven types of engineered bunkers and their playing characteristics. These seven bunker types have somewhat different playing characteristics resulting in markedly different expected landing areas. Bunker difficulty is directly related to bunker type. Some types are more forgiving than other types.

Carry Bunker

Carry bunkers are normally flat, low-lying protrusions out into the fairway, allowing golfers to play directly over them. Carry bunkers are almost always positioned well short of the preferred landing area and are easily flown. Escape is relatively easy due to the flat lies which are normally experienced. Often a carry bunker will be found on the inside of a dogleg hole.

Collection, Bathtub, Gathering Bunker

This type derives its character from the ground surrounding it, which is sculpted to channel the ball into the bunker. A collection bunker can be very deep, thus forcing golfers to play backward or sideways to recover. Most are found in older courses with a few examples in the United States.

Definition Bunker

Architects usually employ definition bunkers to highlight a target zone, the landing area off the tee, the second shot landing zone on a par-5, or the green itself. Generally the degree of difficulty of the bunker relates to the length and type of shot required and its position in relation to the fairway. The definition bunker is the type architects use most frequently.

Directional, Target Bunker

Architects use bunkers to reveal a shot-making line or direction. Sometimes a bunker is used that can't be reached by all but the longest hitters to act as an aiming reference. This technique is commonly employed on dogleg holes to give golfers a greater feel for how the hole flows.

Face Bunker

Invariably a part of a green complex, this bunker shows its face to the approaching golfer. Strategically, architects use face bunkers for deception, to conceal a green's true distance. Its penal quality varies according to the severity of the face's decline.

Pot Bunker

The pot bunker is a small round-shaped bunker with steep sides that resemble the shape of a pot. The penal quality of a pot bunker is high because of the need for a severely elevated shot and the cramped space in which the golfer must stand.

Saving Bunker

Saving bunkers are used by architects to spare golfers from a far worse fate. Saving bunkers are used by architects to decrease the penalty for a slightly mishit shot. The architect's objective is to keep the route to the green that involves the saving bunker in play. Saving bunkers involve risk/reward from the perspective of both the architect and golfer. From the golfer's perspective, if the saving bunker were not in place, the risk would be too great to go near that section of the fairway or green. The architect recognizes the golfer's perspective and incorporates a saving bunker to reduce risk, thus enticing the golfer to consider that route to the green. Golfers must judge whether the architect has used the bunker as a trick to keep an otherwise unacceptable route in play.

Waste Bunker

Waste bunkers are long and flat and are kept in a native condition; consequently waste bunkers usually have a firm texture and usually provide good opportunities for escape. Waste bunkers can also parallel major trouble thus saving golfers from worse fate.

6.2 Bunker Pattern

Robert Trent Jones Jr. analyzes six common bunkering patterns that are related to bunker type. Jones advises golfers to consider bunkering patterns as distinct hazards that affect the golfer's shot-making choices. Bunker difficulty is directly related to bunker pattern.

Central Bunkering

This pattern divides a fairway into two sections, providing golfers with two or more playing options for a given landing area. In most cases this pattern is found in the tee-shot landing area or in the second landing area on a par-5.

Cluster Bunkering

This pattern makes use of a grouping of three or more bunkers to add definition and visual contrast to an otherwise bland or open hole site. This pattern usually has directional ramifications.

Cross Patterns

This series of bunkers off the tee is usually set at a diagonal, bisecting the width of the fairway. Angled patterns complicate the distance versus direction analysis.

Framing or Bracket Patterns

This pattern arranges the bunkers in pairs or a series of pairs on opposite sides of a fairway or green. Framing bunkers squeeze the fairway landing area or green entrance, challenging golfers to hit the ball between or over them. They also force golfers to plan exactly how they should place their tee shot or what angle is best for the approach to the green. Bracket patterns near greens serve to produce pin locations of varying degrees of difficulty.

Staggered Patterns

Architects Mackenzie and Tillinghast used this variation of the bracket pattern to ensure that golfers consider accuracy rather than pure distance as a means to defeat a hole. This arrangement places bunkers at different distances on opposite sides of the fairway rather than in balanced pairs. This pattern is used both in landing areas off the tee and near the green.

Surrounding Pattern

This pattern is used exclusively for green surfaces on those occasions when the architect guards the edge of the green on all sides because the golfer has a short approach or tee shot. Surrounding bunkers make shots a hit or miss affair.

6.3 Bunker Placement

The early theory of placing bunkers saw them as walls that blocked a golfer's advance to a green. Over time they became a series of carefully arranged traps with the objective of catching inaccurate or weakly hit shots.

The positioning of hazards has been influenced by three factors: 1) the increasing length of golf shots, 2) the desire of architects to test expert, intermediate and beginning golfers, and 3) the improved aesthetics that properly located and designed bunkers can bring to the golfing experience.

Bunker difficulty is also related to placement.

6.4 Sand Characteristics

Generally speaking, architects work with available materials, so the sand golfers find on a course are likely to be a local variety. Bunker sand selection is guided by a number of considerations: a) in windy areas, heavier types are used to prevent the sand from blowing out, b) in areas with frequent rain, porous types that drain and dry more quickly are used, c) on slopes, sand with drainage and compaction characteristics are used to minimize sliding, and finally d) color content and aesthetic characteristics are considered.

The four most common types of bunker sand are coral, limestone, river and silica. Coral sand seldom produces a buried lie. Limestone can be ground into sand of various grades, from a very fine or powdery type to a larger, coarser type. Generally, the softer and deeper the sand is spread the greater chance for a buried lie. Limestone sand usually allows golfers to generate substantial backspin.

River sands are often round and hard. They are derived from many parent materials. Playing characteristics vary according to source, size, particle distribution and other factors. The ball tends to sit up well on this type of sand.

High-purity silica sand is often very white, lending sharp contrast to the scene on the course. The particles tend to be rounded, increasing chances of a half buried lie. Explosion shots out of silica sand rarely spin well.

Golfers should also keep in mind that the playing characteristics of dry sand and wet sand are distinctly different. Dry sand may cause the wedge to bury itself behind the ball. Wet sand is more compacted and the club will often bounce off its surface, causing golfers to skull or blade shots.

Bunker difficulty is also related to the type of sand.

6.5 Bunker Depth

The depth of a bunker is measured from the lowest point in the sand to the top of the front face of the grass bank in which the bunker is cut.

Bunker difficulty is also related to bunker depth.

The 5 sub-factors of Fairway Bunkers describe all bunkers. At this point you are evaluating only fairway bunkers. Green bunkers will be evaluated under Green Complex. As you assign weights to each sub-factor, consider every aspect of the bunker system from the perspective of the architect, whose design was intended to defend a fairway landing zone. The 5 sub-factors of Fairway Bunkers must total 1,000.

6. Fairway Bunkers

6.1 Bunker Type

6.2 Bunker Pattern

6.3 Bunker Placement

6.4 Sand Characteristics

6.5 Bunker Depth

	Importance
Total	1,000

7. Water Hazards

The word hazard causes the golfer to have negative feelings of peril, fear, and jeopardy. In turn these emotions decrease the probability that golfers will decisively select and execute the appropriate shot. Of all the hazards feared by golfers, water hazards are considered to be among the more severe. By learning how architects use water hazards, golfers can learn to lessen negative thoughts.

Hazards don't necessarily mean that the golfer is in trouble. A famous line from the legendary Bobby Jones sums it up: *"The value of any hazard is oftentimes more psychological than penal."* and this is especially true for water hazards.

Architect Alister Mackenzie described the essence of many hazards when he observed, *“It is an important thing in golf to make holes look much more difficult than they really are. People receive great pleasure in challenging a hole which looks virtually impossible and yet is not so difficult as it appears.”*

The trick is to recognize the required shot's level of difficulty and then to be able to minimize or disregard the water hazard's existence. Whenever golfers are required to play a penal shot directly over a severe hazard, the architect normally gives careful attention to ensuring that the obstacle is challenging yet fair. Architects generally incorporate water near a tee to distract golfers, but seldom to penalize them unless a major mistake is made.

Generally, water near a fairway is intended to tempt golfers to play near the water to obtain a preferred angle of attack or a distance advantage for the next shot. Another reason water is located adjacent to a landing area is simply to capture poorly played shots. When water is placed directly across the fairway, the architect is tempting the golfer to play over the water versus a conservative lay-up approach. When fronting a green, golfers must not only clear the water but must also stop the ball safely on the green.

Obstacle squeeze occurs when obstacles on both sides of a landing zone prevent a player from playing away from either obstacle. This is especially difficult when obstacle squeeze consists of water hazards and/or out-of-bounds or extreme rough on both sides of a landing zone within 20 yards of the center of that landing zone.

Water hazard difficulty is related to the angle of the hazard with respect to the hole's centerline and its shape. Rate a cavern or quarry as if it is filled with water.

7.1 Rivers, Streams, Creeks

A river is a large natural flowing stream of water that cuts its own course through the land until it reaches a sea, lake or another river. On its way, rivers constantly change the landscape. Most rivers have their sources in mountains or uplands and are fed by rain or melted snow. Rivers change their appearance depending on season. Rivers have a psychological effect similar to oceans.

Streams and creeks are like rivers but much smaller. Streams are generally shallow and fast moving. Creeks are deeper and slower moving.

Rivers, streams and creeks have erratic often ribbon like perimeters that serve to widen the body of water. Wetland, rough, rocks and wasteland are often found on the perimeter of rivers, streams and creeks.

Rivers, streams and creeks can border or cut across a fairway; consequently, they can serve as either lateral or carry hazards.

7.2 Lakes and Ponds

A lake is a large inland body of water. A pond is a body of water, smaller than a lake, often of artificial construction. Lakes and ponds can also serve as either lateral or carry hazards. The perimeter of lakes and ponds is generally sloped towards the body of water, such that shots that seemingly miss but come close to the water hazard often roll and bounce into the hazard.

7.3 Ocean

The earth's waters are divided by continents into the Atlantic, Pacific, Indian, Arctic and Antarctic oceans. They are all connected, forming a single world ocean that covers more than 70% of the surface of the earth.

The sport of golf began in Scotland on public linksland, which is the sandy, undulating hills or dunes formed along an ocean’s coastline by wind and waves. Ocean coast lines are probably the most penal of all water hazards due to the fact that the tremendous openness of the seaside setting causes many golfers to become disoriented. Severe and changing winds characterize ocean settings.

An ocean coastline presents golfers with among the more severe psychological hazards.

7.4 Marshes and Wetlands

A marsh is an area of wetland, beside a river, lake or bay that may be temporarily flooded. The soil is often silty and is characterized by the presence of plants such as reeds. The exact boarder of marshes and wetlands is often difficult to judge; consequently, golfers are often lured by architects to place their shots too close to the hazard in the false hope of gaining an approach shot advantage.

7.5 Buffer Zone

Water surrounding a green is a rarity and offers little or no room for error. Architects use this configuration on relatively short par-3 holes and on par-5 holes that call for a short approach shot. Shooting for a flagstick located close to the water’s edge is exactly what the architect is tempting the golfer to do. The buffer zone is the area between the perimeter of the water hazard and the edge of the putting surface, which may be a slope, bunker, mound or flat area.

The broad category of water hazards has been subdivided according to type. Vision difficult holes that you have played, which involve the 4 types of water hazard. Buffer Zone applies to all of the water hazards. If you think that the 4 types of water hazard are equal and each of these hazards is more than twice as important as the buffer zone, assign 225 points to each hazard and 100 points to the buffer zone for a total of 1,000. If you have not played a hole near one of the types, vision a famous hole that you are familiar with. Assign points according to the degree of difficulty as you see it. Remember that there isn’t any right or wrong answer or prescription. The 4 types of water hazard plus buffer zone must total 1,000.

	Importance
7. Water Hazard	
7.1 River, Stream, Creek	
7.2 Lake or Pond	
7.3 Ocean	
7.4 Marsh or Wetland	
7.5 Buffer Zone	
Total	1,000

8. Green Complex

Green complex is evaluated by considering its sub-factors. Green complex concerns the difficulty of hitting the green with the approach shot. Primary considerations are green size, length of shot, how well the green holds and the difficulty of normal hole locations.

8.1 Green Entrance

Green entrance refers to the section of fairway and/or green boarder that connects the fairway with the green. A description of the green entrances commonly used by architects follows:

Fairway-to-green tie-in is the basic green entrance. Generally, there is little or no elevation change. This entrance is used when a lengthy approach shot is required, because it provides options to bounce, roll, pitch, bump-and-run, chip, or putt the ball onto the green. Architects vary the width of a green entrance depending on the length of the approach shot. For longer approaches, the entrance may be as wide as the green itself. With a short approach, the entrance may be less than half the width of the green.

Runway or ramp is another type of green entrance. This is a narrow strip of land, maintained at fairway height that sweeps up between a pair of bunkers or other features to a green that is elevated to some degree. Because the ramp is always narrower than the width of the green, successfully bouncing the ball onto the green requires extreme accuracy. Another factor that restricts the run-up option is the elevation change, which will slow or stop an approach shot. When this type of entrance is present, golfers should realize that the architect intended the green to be attacked in an aerial manner.

A Tongue is a small portion of a fairway, almost always detached from the major fairway that connects with a green's front edge. This type of entrance is usually defined by rough on its perimeter. Like the ramp, the tongue generally represents a less desirable option for approaching the flag.

A side-angle tie-in is another type of green entrance. For this entrance the front portion of the green is closed with bunkers and other obstacles much in the same manner as in a forced carry situation; however, an alternate route is created to the side of the green by looping a portion of the fairway around the obstacles.

Architects also build some greens with no entrance by cutting off the green with bunkers, rough, or other hazards, thus forcing the golfer to carry the ball to the putting surface. Many elevated greens have no entrance.

Degree of difficulty is related to the type of entrance with no entrance being the most difficult.

8.2 Green Dimensions

Today, the area of an average modern green is about 600 square yards. This means that 75 feet is probably the longest putt most golfers will ever encounter.

From the early 1900s to 1930, Ross, Tillinghast, Mackenzie, Macdonald, et. al. evolved the design and shape of greens. Following World War II, Dick Wilson and Robert Trent Jones Sr. designed sweeping greens with two or more distinct pinning areas. In the 1950s and 1960s, the popularization of professional golf led to the creation of smaller greens to challenge the pros' shot-making abilities.

The golf boom that began in the 1970s and continues today caused architects to create larger greens to provide more pin positions, allowing surfaces to remain in good shape despite greatly increased traffic. Degree of difficulty is related to dimension with the extremes at both ends of the dimension curve being the most difficult.

8.3 Green Bunkers

The discussion of fairway bunkers includes a description of all types of bunkers, patterns and sand characteristics that are used within green complexes. Architects use bunkers within the green complex as, 1) penal hazards to catch errant or misguided shots, 2) defenses to protect certain pin placements, and 3) to keep the ball from encountering even worse trouble such as a water hazard. Degree of bunker difficulty is related to type, pattern and sand characteristics. Pot bunkers with steep rough surfaced faces are among the more difficult.

8.4 Green Rough

Architects use rough within green complexes to: 1) limit the landing area for approach shots, 2) defend certain pin placements, and 3) keep the ball from encountering even worse trouble such as a water hazard. Rough difficulty is related to grass type and length and topography.

8.5 Outlying Area

Outlying area refers to the terrain that surrounds the green complex. Outlying area can be as penal as an ocean cliff, water hazard, out-of-bounds, thick undergrowth, wasteland or any of the most sever hazards to as forgiving as another fairway. On some long par-5 holes, some golfers view the green complex's outlying area as one of the preferred landing areas for a long approach shot. Degree of difficulty is related to the nature of the outlying area.

Topography of the green within Green Complex is covered under Green Design and Putting Surface is another major golf course group. Consider the importance of the 5 components of green complex. Assign points according to the degree of difficulty of your shot-making ability. The 5 sub-factors of Green Complex must total 1,000.

8. Green Complex

- 8.1 Green Entrance**
- 8.2 Green Dimension**
- 8.3 Green Bunkers**
- 8.4 Green Rough**
- 8.5 Outlying Area**

	Importance
Total	1,000

9. Green Design

Golf consists of two games: 1) Getting the ball from the tee to the green, and 2) Holing the ball once it is on the green. From a shot-making, scoring point of view, the second sport is just as important as the first, because golfers of all playing levels take about half of their shots on or around the green. According to the PGA, tour players sink only 54.8% of their six-foot putts and 83.1% of their three-footers. This study shows that amateurs sink considerably lower percentages.

Green design refers to the overall layout, shape and surface contour of the green. Degree of difficulty is related to green design. Golf course architects use combinations of the following designs; for example, a decked green may also have flat and sloped areas of the green that come into play. Therefore, golfers must assess all of these designs for each green. The most common green designs follow:

9.1 Flat

Regardless of how flat a green may appear, every putting surface contains minor amounts of break.

9.2 Sloped

Sloped greens have gradual amounts of elevation change in their design.

9.3 Decked

Decked greens have two or more playing surfaces connected by steep slopes.

9.4 Contoured

Countered greens are either crowned or bowled. Crowned greens require pinpoint accuracy because shots tend to fall away from the center of the crown. Bowled greens cause approach shots to gather towards the center of the bowl. Contoured greens have multiple slopes on the green's surface such that it is usually necessary to execute a curved putt from distances of ten feet or more.

9.5 Rolling

Humps, mounds, ridges, and hogbacks are features, which provide multiple slopes that differ in size, style and intensity. When they lie in a golfer's intended putting line, the required analysis is complex because the golfer must consider the effects of their uphill, downhill and sidehill slopes.

The 5 sub-factors of Green Design concern topography. Many greens have multiple topographies; nevertheless, one or more of these sub-factors may be a distinguishing characteristic. Vision yourself standing over a 40 foot putt on greens with each of these distinguishing topographies and then again over a 6 foot putt. Assign points according to your judgment of degree of putting difficulty. The 5 topographies must total 1,000.

9. Green Design

9.1 Flat

9.2 Sloped

9.3 Decked

9.4 Contoured

9.5 Rolling

	Importance
Total	1,000

10. Putting Surface

Green surface refers to the condition of the grass mat or other surface that covers the shapes and contours described under green design. Ball marks are indentations in the putting surface made by approach shots. The rules of golf allow ball marks to be repaired anywhere on the green. Spike marks are scraped areas of turf grass caused by the spikes on the bottom of golf shoes. The rules of golf do not permit spike marks, spike holes and heel prints to be repaired along the golfer's line of play before the shot is made. From an architect's perspective, the putting surface is the most carefully detailed feature on a golf course. Architects expend great effort and time shaping and refining greens to obtain exactly the effects they desire.

10.1 Grass Type

Bentgrass is used for greens in cool or temperate climates. Frequently, it has little grain due to its upright growth habit, and its resistance is low due to its fine leaf blades.

Bermudagrass is a warm-season grass with coarse leaf blades. It is frequently found on greens in warmer climates; it grows quickly and offers moderate to high resistance. Almost invariably, it has noticeable grain due to its horizontal growth propensity. When bermudagrass is maintained at low heights, grain becomes less of a factor and speed increases dramatically. Bermudagrass greens are generally slower than bentgrass.

Fine fescue is a cool-season grass with thin blades, a bristly feel and moderate to strong resistance. It usually lacks a prevailing grain direction because it grows in groups of individual plants whose blades develop in a sporadic manner. Normally maintained at moderate heights, it cannot be maintained consistently as low as bentgrass, so greens that contain fine fescue are generally slower.

Annual Bluegrass (Poa Annua or Poa) is a cool-season grass with strongly invasive characteristics in the presence of bent and fescue. Poa Annua has a bushy, thatchy quality that is very pronounced when it is producing whitish seed heads. The Poa Annua leaves are usually a lighter shade of green than those of fescue or bentgrass. After cutting, it grows at a much faster rate than bentgrass or fescue, and because it is considerably taller, produces more resistance. Poa Annua grass greens generally lack consistency.

Zoysia (Korai) is a warm-season grass often used on summer greens in Japan. It has pronounced grain characteristics that will strongly influence a shot.

Mixed Grass: Many greens intentionally mix two or more grass varieties that have very different grain and resistance characteristics. This happens with considerable frequency when poa annua invades bentgrass or fescue greens. Different growth rates produce variable grain and resistance scenarios for putts traveling through patches of different grasses.

Degree of difficulty is related to grass type.

10.2 Speed

Speed refers to how quickly a ball will slow down on a flat area of a green. Factors like wind, sun, temperature and rain cause speed to change dramatically. Golf course superintendents largely establish speed through maintenance practices. Mowing, irrigation and weather affect speed. Rain, fog and early-morning dew provide moisture, which decreases speed; as the grass dries, speed picks up. Fast greens are generally considered to be more difficult.

10.3 Grain

Grass has grain if the blades grow in a relatively horizontal fashion with respect to the putting surface. Greens that have a grain are more difficult.

10.4 Resistance

Resistance refers to how quickly grass on a putting surface will slow down a ball. The extremes at both ends of a resistance scale are more difficult.

10.5 Firmness

Firmness refers to the green's underlying base. Firmness is affected by rainfall and watering regimens. Firmness of the green can change throughout the day due to wet or dry climatic conditions. The extremes at both ends of a firmness scale are more difficult.

These 5 Putting Surface properties tie together to describe the putting surface. Although each of these properties can't exist without the others, you should assign points to the 5 sub-factors according to your judgment of importance. The 5 Putting Surface sub-factors must total 1,000.

10. Putting Surface	Importance
10.1 Grass Type	
10.2 Speed	
10.3 Grain	
10.4 Resistance	
10.5 Firmness	
Total	1,000

11. Wind

Wind considerations play a material part in the design of many courses. Architects have thoroughly investigated the site’s prevailing, seasonal and storm wind patterns. Wind patterns influence how the course is routed and the configuration of certain features. Fairway slopes are used to minimize prevailing wind effects. Also, long Par-4 holes are not routed into the wind because they would play too long.

Design considerations are further complicated by the fact that windy sites often have seasonal and storm winds that blow in different directions than prevailing winds. When playing in windy conditions, golfers should think about their next move as in chess or your “leave” as in pool. Putting can also be substantially affected by strong winds.

Degree of difficulty is related to type of wind and severity. The five types of wind to be concerned about are: tailwinds, headwinds, crosswinds, quartering winds and swirling winds.

11.1 Tailwinds

Tailwinds come from behind the golfer and blow in the general direction of the target. Spin on the ball will have less effect and it will be more difficult to fade or draw shots. Shots generally carry farther, especially if the shot has extra loft.

11.2 Headwinds

Headwinds blow directly toward the golfer from the target. Spin on the ball will be amplified as will fade and draw. Shots will often balloon reducing carry.

11.3 Crosswinds

Crosswinds cut across the shot line in a perpendicular fashion and will cause the ball to move right or left. The challenge lies in gauging the wind’s intensity and deciding how far right or left to start the shot so that the wind will push it to the target area.

11.4 Quartering Winds

Quartering winds blow toward the golfer and cut across the shot line at an angle. Under these circumstances, golfers will have to make both headwind and crosswind adjustments.

11.5 Swirling Winds

Swirling winds rotate or spin and the swirling condition may actually change from shot to shot and throughout the day. For example, one golfer may face a tee shot into a severe swirling wind that moves in a clockwise direction; another golfer in the same foursome may be on the tee when the swirling wind completely subsides; a third golfer may face a mild swirling wind that is moving counter clockwise.

Vision yourself playing holes during each of these winds. Assign points according to your judgment of degree of difficulty for your own shot-making ability. Remember that strategic means features that are “of great importance” to you. If you consider the five winds to be of equal difficulty, assign 200 points to each of them. The five winds must total 1,000.

11. Wind	Importance
11.1 Tailwinds	_____
11.2 Headwinds	_____
11.3 Crosswinds	_____
11.4 Quartering Winds	_____
11.5 Swirling Winds	_____
Total	1,000

12. Psychological Features

Architects use psychology to confuse and bewilder golfers to try shots that are beyond their ability and to forego the opportunity to make other shots that are well within their ability. As a general rule, architects are fair; however, they know that golfer psychology makes severely penal hazards appear more difficult and more forgiving hazards to appear easier.

Altitude is considered a psychological hazard due to the fact that courses above 2,000 feet altitude play shorter than their measured length. In addition, landing zones, where obstacles must be evaluated, are farther from the tee and approach shots to the green are shorter than they would be on similar holes at sea level. Likewise, transition zones are farther from the tee. The effects of altitude on club selection are included under the psychological effects of both fairway distance and green distance.

12.1 Fairway Distance

Fairway play presents distance puzzles that make the sport unique. Not only are golfers hitting the ball long distances, while trying to place it in a relatively small area, but are doing so without the benefit of a standardized playing field to help them determine yardage. Few golfers can look at an area and know whether it is 170, 180, or 200 yards away without some sort of standard reference. Degree of difficulty is related to the ease of determining fairway distances.

12.2 Green Distance

Architects build some bunkers so that their far edge is visually aligned with the putting surface when viewed from the area where the approach shot is intended to be struck. The area between the bunker and the green is hidden, producing the illusion that the green and the bunker are close together. This illusion can cause golfers to underestimate the yardage and select an incorrect club. Degree of difficulty is related to the ease of determining distance to the green on medium to long approach shots.

12.3 Other Illusions

Architects can also create illusions by drawing the golfer’s eye to dramatic features such as flowers to focus attention on the near edge of a feature. At other times, architects reverse the process to make the target area appear more distant than it really is by reducing a feature’s size and positioning it close to the landing area.

On occasion, architects use another ploy to discourage golfers from cutting a dogleg that they could cut without much trouble. For example, a large bunker with a prominent face or other eye-catching feature is placed on the corner of the dogleg with its far edge raised to partially hide the landing area thus making it appear smaller than it is.

Often architects can make holes appear much longer by running alongside it a long, narrow feature like a bunker, waste area, or water hazard.

Trees can be used to produce a number of illusions. By placing them along both sides of a fairway, they can give the impression that the landing area is quite narrow even though it is not. Large trees frequently induce golfers to hit short on an approach shot when they are positioned just off the back of the green. From a psychological point of view, players often become preoccupied with the prospect of playing out of trees, which causes them to underclub.

In addition, if the trees are larger than the trees the golfer is used to seeing, they may make the golfer think that the green is considerably closer than it is. Mountains close to the back edge of greens can produce similar effects. Degree of difficulty is related to the effectiveness of the architect's illusions.

12.4 Elevation Change

Golfers face a different type of illusion when the entire hole gradually ascends from tee to green. Because there are no sharp elevation breaks, many golfers underestimate the elevation change and finish short of their targets. Radically descending holes also confront golfers with distance complications that generally cause over-clubbing. Degree of difficulty is related to the severity of the elevation change.

12.5 Heroic Carry

A heroic hole has at least two distinctly different alternatives for reaching the green in regulation. One lacks a severe penalty for a misplayed shot. With the second, a misplay incurs a severe penalty but, if successfully negotiated, it will reward the player with a far superior position and/or distance advantage.

Sometimes a hole is designed such that there is only one route to the green and that route involves a heroic carry. A famous heroic hole is the par-3 17th hole at The TPC at Sawgrass Course. Degree of difficulty is related to the nature of the heroic carry psychological hazard and the size of the golfer's landing zone.

The five (5) categories of psychology that architects use to confuse golfers explain the psychological aspects of golf course design. Fairway Distance, Green Distance, Elevation, and Heroic Carry are specific. Other illusions are not a catch all. It refers to illusions, which disguise hazards or distract golfers. For example, an illusion which causes golfers to think that a landing zone is smaller or larger than it really is included under other illusions. Fairway distance concerns illusions that are in front of golfers; for example, a horizon that confuses golfers. Lateral illusions such as long sand traps and lateral water hazards are included under other illusions. Assign points according to your judgment of how each category affects your shot-making ability. The five categories of psychology must total 1,000.

	Importance
12. Psychological	
12.1 Fairway Distance	
12.2 Green Distance	
12.3 Other Illusions	
12.4 Elevation Change	
12.5 Heroic Carry	
Total	1,000

Tying the 12 categories of golf course features together

The process of judging the importance of the sub-factors of the 12 major categories of golf course features to your own shot-making ability is intended to be an educational as well as a thinking exercise. Now that you have judged all of the features used by architects to design 18 puzzles that you must solve every time you play a round of golf from the perspective of the importance to your shot-making ability, you should have an educated view of each of the 12 major categories. The next step in your strategic assessment is to judge the importance of the 12 categories. The procedure is the same as you have learned to use to judge the sub-factors. The total must equal 1,000. We doubt that you will judge them to be equal, but if you think this way, assign 83 points to 8 features and 84 points to 4 features. Again, there are no right or wrong answers. It is your own judgment that counts.

Golf Course Features	Importance
1. The Tee	
2. Fairway Topography	
3. Fairway Style	
4. Fairway Grass	
5. Fairway Outlying Area	
6. Fairway Bunkers	
7. Water Hazards	
8. Green Complex	
9. Green Design	
10. Putting Surface	
11. Wind	
12. Psychological	
Total	1,000