**Golf Project**

**Golf Terminology**

**Golf course** – The course on which golf is played. A golf course will have a 18 holes. It will also have an expected score for a player, hole by hole and for the entire course.

**Hole** – A hole of golf has a *par score*, which is the number of shots that a golfer should take to get it from the tee to in the hole. Holes of golf will have a par score of anywhere from 3 to 5 based on the length of the hole.

**Par** – Taking exactly the expected number of shots to get the ball in the hole.

**Birdie** – Taking one shot less than par to get the ball in the hole. For example, if a hole is a par 4, and you only took 3 shots to get it in the hole, that’s a birdie.

**Bogey** – Taking one more less than par to get the ball in the hole. For example, if a hole is a par 3, and you took 4 shots to get it in the hole, that’s a bogey.

**Round** – A round of golf is playing all 18 holes of a golf course.

**Round Score** – How many total shots you took while playing a round of golf.

**Par Score** – The total number of shots a golfer would take if they got a par on every hole of a course, usually around 72.

**Score to Par** – Subtracting the Par Score of a Golf Course from the player’s Round score will give you that player’s Score to Par, which is usually a number around 0. 0 means your Round Score and the Golf Course’s Par score were the same. A negative value means you took fewer shots than the par Score. (Good) A positive value you took more shots than the Par Score. (Bad)

**Handicap(Hole)** – Each hole on a golf course has a handicap, which is its difficulty rating from 1 to 18. The numbers 1 to 18 are assigned to the holes with 1 being the most difficult hole and 18 being the easiest. These numbers are never repeated on the same course, thus uniquely assigned to the 18 holes that make up the course.

**Handicap(Golfer)** – A player’s handicap is the average Score to Par for them over all of the rounds of Golf that they play. For example, if the golfer played 3 rounds and their score to par in the three rounds was +3, -1 and +8, their handicap would be +2, since, on average, they score 2 shots higher than par.

**GolfHoleClass**

Data fields (all should be private):

*par* (int)

*handicap*(int) – This is a unique number 1 to 18, representing the difficulty of the hole on the course, with 1 being the most difficult and 18 being the most challenge.

Constructors:

No-arg Constructor – simply randomly assigns a value of 3 to 5 to par data field. handicap is set to 0.

Methods:

Getters and setters for data fields.

public int play()

This method will produce and return an integer score for a player on this hole, using the following process:

* First check for a birdie, which is 1 less than par. The percent change of this is the handicap number. (GolfHole with a 7 handicap has a 7% change of scoring a birdie.
* If there isn’t a birdie, check for a bogey, which is one over par. The percent chance of this happening is (20 – handicap). Thus a GolfHole with a 12 handicap has an 8% chance of producing a bogey.
* If it isn’t a birdie or a bogey, it is a par.
* This method should return, as an integer, the score for a hole.

You will also need getPar, getHandicap and setHandicap methods.

**GolfCourse Class**

Data fields:

String courseName – This holds the name of the GolfCourse

GolfHole[] *hole* – This array holds the 18 GolfHoles that comprise the golf course.

int *parScore* – This will hold the score for the entire GolfCourse, if you got a par on every hole.

Constructor:

Only receives the name of the course. The rest is calculated randomly. Generate 18 GolfHole objects to fill the hole array. After that, randomly assign unique handicap values to these holes, 1 to 18 using the assignHandicaps() method.

*hole* would be randomly assign par and handicaps for the 18 GolfHole instances within the array. For example:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Index** | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| **Par** | 4 | 3 | 5 | 5 | 4 | 3 | 3 | 4 | 5 | 4 | 4 | 4 | 3 | 5 | 4 | 4 | 3 | 5 |
| **Handicap** | 12 | 5 | 3 | 18 | 11 | 13 | 1 | 15 | 4 | 14 | 8 | 17 | 2 | 16 | 7 | 9 | 6 | 10 |

parScore would be 72 (sum of all Par scores for all 18 holes)

Methods

public void makeHoles()

This method will simply populate the hole array with GolfHole instances.

public void assignHandicaps()

This method will uniquely and randomly assign the Handicap values (1 to 18) to each of the GolfHole objects in the *hole* array. The call to this method will appear inside the constructor, after the array has been populated with GolfHole objects. (makeHoles)

public int calculateParScore()

This method will calculate and return the par score, which is simply the sum of par data fields of the GolfHole objects in the holes array.

public GolfHole getHole(int holeNum) – This method will return a specific GolfHole from the hole array

public void showCourse() – An output method to show the GolfCourse, hole by hole. See example below.

public GolfRound playCourse() – This method will return a GolfRound instance, played on this course.

You will also need getName and getParScore

**GolfRound**

Data fields:

GolfCourse *course* – This is the GolfCourse on which the GolfRound was played.

int [] *scores* – This is an array of 18 integer values representing the scores by the player on each hole. This method will utilize the play method, found on the GolfHole class.

int *roundScore* – This will hold the total number of strokes by the player over those 18 holes.

int *scoreToPar* – This will show how the roundScore compares to the parScore of the course. For example, if the parScore was 72, but the roundScore was 73, the scoreToPar would be 3. If the parScore was 70 and the roundScore was 68, the scoreToPar would be -2. (2 under par)

Constructor

This method will receive a GolfCourse object for its constructor. Within the constructor, it should populate the scores array randomly (using the playRound method) and calculate the roundScore and scoreTopar

Methods

public int[ ] playRound() – This method will build and return the *scores* array by “playing” each hole on the course.

public int calculateRoundScore() – This method will calculate the total strokes taken in that round.

public void showRound – This method will output the course name, hole by hole the par and the score that the player got, the roundScore and the score to par for the player.

You will also likely need getCourse and getRoundScore

**Golfer Class**

Finally the Golf class. A Golfer

Data fields:

String name – This holds the name of the Golfer

ArrayList<GolfRound> rounds – Stores all the rounds of golf a player has played.

double playerHandicap – Stores the average score of the player compared to par, based on their performance on all rounds played.

Constructor

The constructor just receives a String to populate the name data field.

Methods

public void playRound(GolfCourse)

This method will create a GolfRound object for the received course and add it into the *rounds* ArrayList. It will also call the calculateHandicap() method (see below)

public void calculateHandicap()

This method will go through all of the rounds the player has played and figure out the player’s handicap, which is the average number of strokes that he/she takes compared to par. This method should also assign this value to the playerHandicap data field.

public void showGolfer()

This method will output the golfer’s name, the number of Rounds that they’ve played and their Handicap.

public int uniqueCourses()

This method will go through all of the rounds that the player has played and return the number of different GolfCourses that the player has play upon.

You will also build getRounds and getName

**GolfRunner**

Sample Runner

**public** **class** GolfRunner {

 **public** **static** **void** main(String[] args) {

 GolfCourse masters = **new** GolfCourse("Augusta National");

 masters.showCourse();

 Golfer tiger = **new** Golfer("Tiger Woods");

 tiger.playRound(masters);

 tiger.playRound(masters);

 tiger.playRound(masters);

 tiger.playRound(masters);

 **for**(**int** i =0; i < tiger.getRounds().size(); i++)

 tiger.getRounds().get(i).showRound();

 tiger.showGolfer();

 }

}

**Expected Output**

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Course name: Augusta National

Hole # 1 Par 5 Handicap # 7

Hole # 2 Par 3 Handicap # 12

GolfCourse output

Hole # 3 Par 4 Handicap # 2

Hole # 4 Par 4 Handicap # 15

Hole # 5 Par 4 Handicap # 1

Hole # 6 Par 4 Handicap # 3

Hole # 7 Par 5 Handicap # 13

Hole # 8 Par 4 Handicap # 6

Hole # 9 Par 5 Handicap # 8

Hole # 10 Par 3 Handicap # 16

Hole # 11 Par 4 Handicap # 10

Hole # 12 Par 4 Handicap # 17

Hole # 13 Par 4 Handicap # 18

Hole # 14 Par 3 Handicap # 5

Hole # 15 Par 4 Handicap # 11

Hole # 16 Par 4 Handicap # 14

Hole # 17 Par 3 Handicap # 4

Hole # 18 Par 5 Handicap # 9

Par Score is 72

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Course name: Augusta National

Hole # 1 Par 5 Score: 5

Round #1 Output

Hole # 2 Par 3 Score: 3

Hole # 3 Par 4 Score: 4

Hole # 4 Par 4 Score: 4

Hole # 5 Par 4 Score: 4

Hole # 6 Par 4 Score: 4

Hole # 7 Par 5 Score: 5

Hole # 8 Par 4 Score: 5

Hole # 9 Par 5 Score: 5

Hole # 10 Par 3 Score: 4

Hole # 11 Par 4 Score: 4

Hole # 12 Par 4 Score: 4

Hole # 13 Par 4 Score: 4

Hole # 14 Par 3 Score: 3

Hole # 15 Par 4 Score: 5

Hole # 16 Par 4 Score: 4

Hole # 17 Par 3 Score: 3

Hole # 18 Par 5 Score: 5

Par Score is 72 Round Score is 75

Score to par is +3

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Course name: Augusta National

Hole # 1 Par 5 Score: 5

Hole # 2 Par 3 Score: 3

Hole # 3 Par 4 Score: 4

Round #2 Output

Hole # 4 Par 4 Score: 3

Hole # 5 Par 4 Score: 5

Hole # 6 Par 4 Score: 4

Hole # 7 Par 5 Score: 5

Hole # 8 Par 4 Score: 4

Hole # 9 Par 5 Score: 6

Hole # 10 Par 3 Score: 4

Hole # 11 Par 4 Score: 3

Hole # 12 Par 4 Score: 5

Hole # 13 Par 4 Score: 4

Hole # 14 Par 3 Score: 3

Hole # 15 Par 4 Score: 4

Hole # 16 Par 4 Score: 3

Hole # 17 Par 3 Score: 2

Hole # 18 Par 5 Score: 5

Par Score is 72 Round Score is 76

Score to par is +4

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Round #3 Output

Course name: Augusta National

Hole # 1 Par 5 Score: 5

Hole # 2 Par 3 Score: 4

Hole # 3 Par 4 Score: 4

Hole # 4 Par 4 Score: 4

Hole # 5 Par 4 Score: 4

Hole # 6 Par 4 Score: 4

Hole # 7 Par 5 Score: 5

Hole # 8 Par 4 Score: 4

Hole # 9 Par 5 Score: 5

Hole # 10 Par 3 Score: 3

Hole # 11 Par 4 Score: 4

Hole # 12 Par 4 Score: 3

Hole # 13 Par 4 Score: 3

Hole # 14 Par 3 Score: 3

Hole # 15 Par 4 Score: 4

Hole # 16 Par 4 Score: 4

Hole # 17 Par 3 Score: 3

Hole # 18 Par 5 Score: 5

Par Score is 72 Round Score is 71

Score to par is -1

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Course name: Augusta National

Hole # 1 Par 5 Score: 5

Hole # 2 Par 3 Score: 3

Hole # 3 Par 4 Score: 5

Hole # 4 Par 4 Score: 4

Round #4 Output

Hole # 5 Par 4 Score: 4

Hole # 6 Par 4 Score: 4

Hole # 7 Par 5 Score: 4

Hole # 8 Par 4 Score: 5

Hole # 9 Par 5 Score: 4

Hole # 10 Par 3 Score: 3

Hole # 11 Par 4 Score: 5

Hole # 12 Par 4 Score: 5

Hole # 13 Par 4 Score: 5

Hole # 14 Par 3 Score: 3

Hole # 15 Par 4 Score: 4

Hole # 16 Par 4 Score: 4

Hole # 17 Par 3 Score: 2

Hole # 18 Par 5 Score: 4

Par Score is 72 Round Score is 74

Score to par is +2

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Golfer Output

Golfer name: Tiger Woods

Rounds played: 4

Handicap 2.0

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