CP1401 SP1 2017 Assessment 1
Planning the Tropical Golf Game

Task

You are to plan a golf game program as outlined in the following description. Use what you have learned in class, including functions, selection and repetition. Assessment 2 will cover the implementation of this program in Python.

See the last section of this document for sample output showing how the game is played.

Program Features:

Short description:

- You are required to prepare a plan for a game of Tropical golf. The player will be attempting to get the ball in the hole using the least amount of swings.

- The rules and gameplay for the program are as follows:
  - The ball starts 230m away from the hole
  - The player chooses one of three clubs, each of which hits a different average distance
  - Every hit travels directly towards the hole in a straight line (this is a simple golf game, we're only playing in 2D)
  - Once the ball is in the hole the player is told how many swings it took and whether they are over or under par
  - If the player wishes to continue the game starts again, but remembers the player's previous score
  - When the player chooses to quit, the game thanks the player by name and says goodbye

Detailed instructions:

Ensure that your program has the following features:

1. Ask the player's name and welcome them to the game using their name.

2. Show the game menu:

```
(I)nstructions
(P)lay golf
(Q)uit
```

   The user will enter the first letter of each option to choose it.

3. If the user chooses (I) then the following message is to be displayed:|

```
This is a simple golf game in which each hole is 230m game away with par 5.
You are able to choose from 3 clubs, the Driver, Iron or Putter. The Driver
will hit around 100m, the Iron around 30m and the Putter around 10m. The
putter is best used very close to the hole.
```

   After the instructions are displayed the game menu will be presented again.

4. If the player chooses (Q) then the following message is to be displayed:
   `Farewell and thanks for playing <user name>.`

5. After displaying the instructions, or playing a round of golf, the program is to return to the menu and loop until the user chooses to quit

6. If the user chooses (P) then a game of golf will begin as described below

Playing the game:

- The player starts 230m from the hole

- For each swing, the player chooses a club and then the program generates the distance hit for each shot, updating the distance to the hole accordingly. After each swing the distance the ball travelled, and the distance remaining is displayed along with the current score using something like:
    - `Your shot went 103m. You are 127m from the hole, after 1 shot/s.`

- The player has three clubs to choose from for each shot. Each club hits the ball a set average distance, but the actual distance randomly varies between 80% and 120% of the average. You will need to generate a random number between 80 and 120 to do this.

- Check out http://flowgorithm.org/documentation/intrinsic-functions.htm and look up 'Random' to see how to generate a random number in Flowgorithm

- The clubs and their average distances are:
    - Driver: 100m (actual distance will be a random number between 80 and 120)
    - Iron: 30m
    - Putter: 10m*

  ***When the ball is inside 10m and the putter is used, the shot will be between 80% and 120% of the distance to the hole, not the club's average distance. The minimum distance the putter can hit is 1m (no 0m hits). All distances are whole numbers.**

- The user will enter the first letter of a club to choose it (i.e. '**I**' or '**i**' for the Iron)

- If an invalid club is chosen, this is counted as an air swing (missed the ball) and the number of shots increases by one, but the ball doesn't move.
    - `Invalid club selection = air swing :( Your shot went 0m. You are 230m from the hole, after 1 shot/s`
    - Note the similarities to the output from a successful swing

- The ball cannot be a negative distance to the hole. Whether it is in front of or behind the hole, it is still a positive distance to the hole. Most programming languages (including Flowgorithm) have an absolute value function that you can use to help with this.

- Play proceeds until the ball is in the hole (distance to the hole is zero), and then the program informs the user of their score.

- The players score is the number of shots taken to get the ball in the hole. The final output will display the number of shots taken and how this relates to par. If their score is less than 5 (par for this hole) is "under par", equal to 5 is called "par", and more than 5 is "over par". See sample output for exact outputs.

- `Clunk... After 10 hits, the ball is in the hole! Disappointing. You are 5 over par.`
- `Clunk... After 5 hits, the ball is in the hole! And that's par.`
- `Clunk... After 3 hits, the ball is in the hole! Congratulations, you are 2 under par.`

- If the player has done a previous round (i.e. this is the second time the game is played), the game should then display the total score with an appropriate message, and then show the game menu again.

Planning:

You are to divide your solution into functions, following the principles shown in class. These may involve one for each menu option (other than Quit) as well as functions for parts of the golf game (e.g. a single swing could be implemented as a function). For each function you are to provide an IPO chart listing all variables which are needed for your solution. You should consult the lecture slides and your textbook for examples of IPO charts. In cases where selections are necessary you must include a suitable condition action table directly below the IPO chart. Follow the sample solution provided as a guide.

You also need to provide a runnable Flowgorithm file that shows how the game would operate

You may show your assignment to your tutor during practical time to get comments or suggestions. It is important to note that you can only get help from staff in practical time after your prac work is finished.

General Principles:

In this assignment, you will be focusing on basic planning using selections, repetition and functions.

Use the techniques and patterns that you have learned and seen demonstrated in class.

- Make use of named constants (named in all caps) where appropriate. You should be able to modify these constants to adjust the gameplay - including the average distances (one per club), the percentages, etc. This is one of the most important aspects of this assignment, so consider carefully how to use constants. Remember to use your constants everywhere you can.

- Note that menu choice and other character selection should handle upper and lower case letters.

- Check out http://flowgorithm.org/documentation/intrinsic-functions.htm and look up '`Random`' to see how to generate a random number in Flowgorithm, and `Abs` to see how to use Absolute Values

Submission:

Hand in one MS Word (.docx) or PDF (.pdf) file containing all of your planning.
Please name the file like: **FirstnameLastnameA1.docx** *or* **FirstnameLastnameA1.pdf**
e.g. if your name were Miles Davis, the filename would be MilesDavisA1.docx

Hand in a second file containing your flowchart. This file should be a Flowgorithm program (ending in .fprg). If you are using a Mac or Linux computer you may instead submit an image file (.jpg, or .png) which you have exported from the flowcharting software of your choice. Name this file in the same way you did your planning document (**FirstnameLastnameA1**).

Submit both files by uploading them to the LearnJCU Assignment One Dropbox, found under Assessment.

Due:

Submit your assignment by the date and time specified on LearnJCU.
Submissions received after this date will incur late penalties as described in the subject outline.

Integrity:

The work you submit for this assignment must be your own. You are allowed to discuss the assignment with other students and get assistance from your peers, but you may not do anyone else's work for them and you may not get anyone else to do any part of your work. A good rule to follow when offering assistance is that you can describe how code works but you should not be giving code to others. Programs that are detected to be too similar to another student's work will be dealt with promptly according to University procedures for handling plagiarism.

If you require assistance with the assignment, please ask **general** questions on the Slack site for it@jcu (see subject outline for details), or get **specific** assistance with your own work by talking with your lecturer or tutor.

NB: A quick note about planning and seeking assistance:

You should plan to start your assessment no less than two - three weeks before the due date. As you become more proficient with coding this length of time will shorten, but in the beginning stages you will need time to become accustomed to "thinking like a programmer".

Planning ahead will allow you time to seek assistance with parts that may be confusing to you. You will not know what these items are until you start to complete the assessment.

Marking Scheme:

Criteria	Unacceptable 0 - 20%	Limited 20 - 40%	Basic 40 - 60%	Sound 60% - 80%	Excellent 80% - 100%	Weighting
Proposes strategies or partial solutions.	No solution provided	The solution provided is mostly incorrect or does not actually solve the problem	The solution provided is mostly correct and solves the problem, but there are more than 5 flaws or missing elements	The solution provided is almost completely correct and solves the problem, but there are more than 3 (but no more than 5) flaws or missing elements	The solution provided is correct and solves the problem, and there are no more than 3 flaws or missing elements	20
Largely conveys meaning to the audience, despite occasional lapses in sentence structure, grammar, punctuation and spelling.	Use of language in planning documents is incomprehensible or non existent.	Language used in planning documents is very difficult to understand. There are numerous consistent mistakes in spelling and grammar	Language used in planning documents is generally understandable. There are more than 5 significant mistakes in spelling and grammar	Language used in planning documents is generally understandable. There are more than 3, but no more than 5, significant mistakes in spelling and grammar	Language used in planning documents is generally excellent. There are no more than 3 significant mistakes in spelling and grammar	10
Appropriate use of problem-solving tools (including algorithm/flowchart, IPO charts and condition/action tables) to communicate the planned solution	No use of any problem solving tools	The flowchart or algorithm provided does not solve the problem, or is not based on other parts of the planning documentation	The flowchart or algorithm provided mostly solves the problem, and is based on other parts of the planning documentation, however there are more than 5 significant mistakes	The flowchart or algorithm provided solves the problem, and is based on other parts of the planning documentation, however there are more than 3, but no more than 5, significant mistakes	The flowchart or algorithm provided solves the problem, and is based on other parts of the planning documentation. There are no more than 3 significant mistakes	30
Effective and correct use of variables in the planned solution	No variables identified	The variables identified are mostly inappropriate or incorrectly used	The variables identified are mostly appropriate and correctly used, but there are more than 5 significant errors	The variables identified are mostly appropriate and correctly used, but there are more than 3, but no more than 5, significant errors	The variables identified are appropriate and correctly used. There are no more than 3 significant errors	10
Effective and correct use of functions or subs in the planned solution	No functions or subs identified	The functions or subs identified are mostly inappropriate or incorrectly used	The functions or subs identified are mostly appropriate and correctly used, but there are more than 5 significant errors	The functions or subs identified are mostly appropriate and correctly used, but there are more than 3, but no more than 5, significant errors	The functions or subs identified are appropriate and correctly used. There are no more than 3 significant errors	15
Effective and correct use of conditionals and loops in the planned solution	No conditionals or identified	The conditionals or loops identified are mostly inappropriate or incorrectly used	The conditionals or loops identified are mostly appropriate and correctly used, but there are more than 5 significant errors	The conditionals or loops identified are mostly appropriate and correctly used, but there are more than 3, but no more than 5, significant errors	The conditionals or loops identified are appropriate and correctly used. There are no more than 3 significant errors	15

Example of game play. Game output is in **Bold**.

What is your name?
Bob
Welcome Bob.

Let's play golf, CP1401 style!

(I)nstructions
(P)lay round
(Q)uit

U

Invalid menu choice.

Let's play golf, CP1401 style!

Golf!
(I)nstructions
(P)lay round
(Q)uit

I

This is a simple golf game in which each hole is 230m game away with par 5. You are able to choose from 3 clubs, the Driver, Iron or Putter. The Driver will hit around 100m, the Iron around 30m and the Putter around 10m. The putter is best used very close to the hole.

For each shot, you may use a driver, iron or a putter – each shot will vary in distance.
The average distance each club can hit is:
Driver = 100m
Iron = 30m
Putter = 10m

Golf!
(I)nstructions
(P)lay round
(Q)uit

P

This hole is a 230m par 5.

You are 230m from the hole, after 0 shot /s.
Club selection: press D for driver, I for Iron, P for Putter.
Choose club: d

Your shot went 103m.

You are 127m from the hole, after 1 shot/s
Club selection: press D for driver, I for Iron, P for Putter.

Choose club: d

Your shot went 95m
You are 32m from the hole, after 2 shot/s
Club selection: press D for driver, I for Iron, P for Putter.
Choose club: i

Your shot went 32m.
Clunk…After 3 hits your ball is in the hole!
Congratulations. You are 2 under par for this hole.
Your overall score is 3 and you are 2 under par after 1 hole/s.

Golf!
(I)nstructions
(P)lay round
(Q)uit

P

This hole is a 230m par 5.

You are 230m from the hole, after 0 shot /s.
Club selection: press D for driver, I for Iron, P for Putter.
Choose club: a

Invalid club selection – air swing :(

Your shot went 0m.
You are 230m from the hole, after 1 shot/s
Club selection: press D for driver, I for Iron, P for Putter.
Choose club: i

Your shot went 30m
You are 200m from the hole, after 2 shot/s
Club selection: press D for driver, I for Iron, P for Putter.
Choose club: p

Your shot went 12m.
You are 188m from the hole, after 3 shot/s
Club selection: press D for driver, I for Iron, P for Putter.
Choose club: d

Your shot went 104m.
You are 84m from the hole, after 4 shot/s
Club selection: press D for driver, I for Iron, P for Putter.
Choose club: d

Your shot went 90m.
You are 6m from the hole, after 5 shot/s
Club selection: press D for driver, I for Iron, P for Putter.
Choose club: i

Your shot went 26m.
You are 20m from the hole, after 6 shot/s
Club selection: press D for driver, I for Iron, P for Putter.
Choose club: p

Your shot went 9m.
You are 11m from the hole, after 7 shot/s
Club selection: press D for driver, I for Iron, P for Putter.
Choose club: p

Your shot went 9m.
You are 2m from the hole, after 8 shot/s
Club selection: press D for driver, I for Iron, P for Putter.
Choose club: p

Your shot went 1m.
You are 1m from the hole, after 9 shot/s
Club selection: press D for driver, I for Iron, P for Putter.
Choose club: p

Your shot went 1m.
Clunk…After 10 hits your ball is in the hole!
Disappointing. You are 5 over par for this hole.
Your overall score is 13 and you are 3 over par after 2 hole/s.

Golf!
(I)nstructions
(P)lay round
(Q)uit

P

This hole is a 230m par 5.

You are 230m from the hole, after 0 shot /s.
Club selection: press D for driver, I for Iron, P for Putter.
Choose club: d

Your shot went 92m.
You are 138m from the hole, after 1 shot/s
Club selection: press D for driver, I for Iron, P for Putter.
Choose club: i

Your shot went 25m
You are 113m from the hole, after 2 shot/s
Club selection: press D for driver, I for Iron, P for Putter.
Choose club: d

Your shot went 106m.
You are 7m from the hole, after 3 shot/s
Club selection: press D for driver, I for Iron, P for Putter.
Choose club: p

Your shot went 6m.
You are 1m from the hole, after 4 shot/s
Club selection: press D for driver, I for Iron, P for Putter.
Choose club: p

Your shot went 1m.
Clunk…After 5 hits your ball is in the hole!
And that's par.
Your overall score is 18 and you are 3 over par after 3 hole/s.

Golf!
(I)nstructions
(P)lay round
(Q)uit

Q

Thanks for playing Bob.