COMP517 - 2020-21 - JAN21 - CA Assignment 1
Circle Calculator

Assessment Information

Assignment Number	1 (of 5)
Weighting	15%
Assignment Circulated	February 2, 2021
Deadline	February 15, 2021
Submission Mode	Electronic via Departmental submission system
Learning outcome assessed	(1) Demonstrate knowledge of fundamental imperative programming concepts such as variables and assignment, conditional statements, loops and methods. (2) Be able to design and code applications in a suitable programming language. (3) Critical awareness of important principles of software design and development, including appropriate naming of variables and classes, code layout, testing and debugging, and documentation.
Late Submission Penalty	Standard UoL Policy.

1 Circle Calculator

This assignment requires you to implement a Circle Calculator using Python.

1.1 Calculator Setup

The Python program you are going to write should first enter into a main menu, allowing the user to choose from the following options:

1. Enter 1, to calculate diameter (d), circumference (C) and area (A), given the radius (r) of a circle.
2. Enter 2, to calculate diameter (d), area (A) and radius (r), given circumference (C) of a circle.
3. Enter 3, to calculate diameter (d), radius (r) and circumference (C), given area (A) of a circle.

Entering the character 'q' should allow the user to exit the program. The input and output values should use *centimetres*.

1.2 Given r, calculate d, C, A

If the user selects '1' at the main menu: the program should allow the user to enter the radius (r) of the circle. Using r, the program should calculate d, C and A of the circle using the following equations:

$$d = 2r, \quad C = 2\pi r, \quad A = \pi r^2$$

where $\pi = 3.14$

1.3 Given C, calculate d, A, r

If the user selects '2' at the main menu: the program should allow the user to enter the circumference (C) of the circle. Using C, the program should calculate d, A and r of the circle using the following equations:

$$d = \frac{C}{\pi}, \quad A = \frac{C^2}{4\pi}, \quad r = \frac{C}{2\pi}$$

where $\pi = 3.14$

1.4 Given A, calculate r, C, d

If the user selects '3' at the main menu: the program should allow the user to enter the Area (A) of the circle. Using A, the program should calculate d, r and C of the circle using the following equations:

$$r = \sqrt{\frac{A}{\pi}}, \quad C = 2\pi\sqrt{\frac{A}{\pi}}, \quad d = 2\sqrt{\frac{A}{\pi}}$$

where $\pi = 3.14$

2 Deadline and Submission Instructions

- Submit

  (a) the source code for all your programs (**do not provide ipython/jupyter/colab notebooks, instead submit standalone code in a single .py file**),

  (b) a README file (plain text) describing how to compile/run your code to produce the various results required by the assignment, and

  Compress the above files into a single zip file and specify the filename as *studentid.zip* (replace "studentid" by your departmental student id). It is extremely important that you provide all the files described above and not just the source code! File types other than zip will not be accepted by the submission system. Every year there is a significant number of submissions without a student id or a name. Obviously, if you do not write name or student id then it is not possible to assign marks to you!

- Submission is via the departmental submission system accessible from `https://sam.csc.liv.ac.uk/COMP/Submissions.pl`

- In your program you should:

  – Use sensible variable and function names which follow convention

  – Use sensible design techniques, in order to make your program readable and easy to maintain

  – Use sensible comments

- You should ensure that it compiles and runs on a departmental lab computer using Python 3.

- You should not use any libraries, unless you are instructed to or they are deemed absolutely necessary (the final decision rests with the assessor).

- You can assume that all input will be of the correct data type.

- Plagiarism checks will be carried out on all material submitted, and will be processed in accordance with the standard departmental academic misconduct policy.