Python Programming Assignment 2

Due : 01/11/2023

Instructions

- Your answers should be in the form of a plain-text Python source file produced.
- Any part of the assignment which is not Python code (your name, the assignment number, question numbers, explanations etc.) should be included as a comment—i.e. a line beginning with #.
- You should use lots of comments and include a block comment above any non- trivial function which describes what it does and what arguments it expects.
- Anything which is not Python code (including question numbers) should be included as an Python comment.
- Submit the assignment on Moodle in a file with your name of the form for example: **arash002.py**

Part 1: Conditional Statements

1. Write a Python code that asks the user to enter an integer, x, between 1 and 100.
   a) Check if the entered number is an integer between 1 and 100.
   b) Check if the entered number is a prime number. If it is a prime number, print " 'x' is Prime" otherwise, print the " 'x' is not Prime"
   c) If the number 'x' is not Prime, print the smallest prime factor of the number.
   - 5 marks for each

Part 2: Nested if Statements

2. a) Write a Python program that asks the user to input their age and whether they have a driver's license (yes/no). Based on their age and driver's license status, determine if they are eligible for various types of vehicles: a bicycle, a motorcycle, a car, or a commercial truck. Print the eligibility options.
   - 10 marks

   b) The grades in a certain class are determined by coursework and a written examination. Both components of the assessment carry a maximum of 50 points. The following rules are applied by the examiners to determine whether a student passes:

   (i) A student must score a total of 45% or more in order to pass
   (ii) A total grade of 44% is moderated to 45%
   (iii) Each component must be passed with a minimum of 20 points
   (iv) If a student scores 45% or more, but does not achieve the minimum grade in one component, he is given a technical fail of 44%, which is not moderated to 45%.

   Develop a flowchart and pseudo-code showing how to input the grades for each component and output the final grade and the result. Then, according to those write the Python codes for this.
   - 5 marks for flowchart and pseudo-code and 10 marks for codes.

Part 3: List Operations

- **Q3.1.** Write simple (i.e. non-compound) Python expressions that will generate lists containing the following sequences of values.

Try to make the expressions as simple as possible.

- a) 2, -4, 8, -16, 32, -64, ... 5248, -1048576
- b) 2, 5, 10, 17, 26, 37, 50, . . . , 2305, 2402.
- c) 1, 1, 2, 1, 3, 1, 4, 1, 5, 1, . . . , 100, 1

- 5 marks for each

- **Q3.2.** Given a general list x find an efficient way to obtain the elements of a list with (a) odd indices, (b) even indices and (c) indices not divisible by 5.
  - 3 marks for each

- **Q3.3.** Create a list named `grades` that contains the following grades: [85, 92, 78, 90, 88, 76, 89, 80, 94, 87]. Write a Python program that calculates and prints the average of these grades while excluding the lowest and highest grades.
  - 5 marks

Part 4: For Loops and Pattern Generation

- **Q4.1.** Using a for loop, print the following pattern: `1  22  333  4444  55555`
  - 5 marks

- **Q4.2.** Find an efficient way in Python to calculate

- a)
$$\sum_{k=0}^{5}(-2)^k$$
- b)
$$\sum_{k=-5}^{0}(-2)^k$$
- c)
$$\sum_{k=-5}^{5}(-2)^k$$

- 5 marks for each

- **Q4.3.**Write a Python program that simulates a game. The program should generate a random number between 1 and 100, and the player needs to guess it. The player has a limited number of attempts, and for each guess, provide hints such as “Too low” or “Too high.” Implement additional features, such as score tracking.

– 10 marks

- **Q4.4.** Create a list of names (e.g., `names = ["Alice", "Bob", "Charlie", "David", "Eve"]`). Write a Python program that asks the user for their name. Check if their name is in the list. If it is, print a personalized welcome message with their name; if not, print a message saying "Access denied."

  – 10 marks

  Good Luck

  A. Ardalan