Python Programming

Day 1 & Day 2 — Assignment

Total Marks: 100 | Submission: Next Class

Name: _____ ID: _____ Date: _____

Part A: Python Basics (Day 1) [40 Marks]

Question 1: Variables and Data Types [8 Marks]

(a) Declare the following variables and print their data types using type(): [4 marks]

- Your name (string)
- Your age (integer)
- Your GPA (float)
- Are you a student? (boolean)

(b) Perform the following type conversions and print the results: [4 marks]

- Convert the string "123" to an integer
- Convert the integer 456 to a string
- Convert the float 3.99 to an integer - explain what happens to the decimal part
- Convert the integers 1 and 0 to boolean values

Question 2: Operators [6 Marks]

Using the numbers 17 and 5, write a program that calculates and prints the following:

- Addition, Subtraction, Multiplication, and Division
- Floor division (//) and Modulus (%)
- 17 raised to the power of 5 (**)
- Comparison results for: 17 > 5, 17 == 5, and 17 != 5

Question 3: String Manipulation [8 Marks]

(a) Given name = "python programming", perform the following: [4 marks]

- Print the string in all uppercase
- Print the string in title case (first letter of each word capitalized)
- Replace "programming" with "language" and print the result
- Print the total number of characters in the string

(b) Using an f-string, produce the following output: [4 marks]

```
"My name is [name], I am [age] years old, and my GPA is [gpa]"
```

Question 4: Input and Conditional Statements [10 Marks]

(a) Take the user's age as input and print an appropriate message: [5 marks]

- Age > 18 → print 'You are an adult'
- Age 13–17 → print 'You are a teenager'
- Age < 13 → print 'You are a child'

(b) Using a ternary operator, check in a single line whether a number is even or odd and print the result. [5 marks]

Question 5: Loops [8 Marks]

(a) Using a for loop and range(), print only the odd numbers from 1 to 10. [2 marks]

(b) Write a while loop program that keeps taking numbers from the user until the user enters 0, then prints the sum of all entered numbers. [3 marks]

(c) Using nested loops, print the following pattern: [3 marks]

```
*
* *
* * *
* * * *
* * * * *
```

Part B: Data Structures & Functions (Day 2) [45 Marks]

Question 6: Lists [8 Marks]

(a) Given fruits = ["apple", "banana", "mango", "orange", "grape"], do the following: [4 marks]

- Print the third element of the list
- Print the last two elements using slicing
- Add "kiwi" to the end of the list
- Remove "banana" from the list
- Sort the list alphabetically and print it

(b) Take 5 numbers from the user, store them in a list, and print the maximum and minimum values. [4 marks]

Question 7: Dictionaries [8 Marks]

(a) Create a student dictionary containing: name, age, marks (a nested dict of subjects), and is_passed. [4 marks]

- Print all keys of the dictionary
- Print the marks for any one subject from the nested marks dictionary
- Add a new subject with a mark to the marks dictionary
- Print all student information in a readable format

(b) From the list of dictionaries below, print the names of students who scored more than 50: [4 marks]

```
students = [{"name": "Rahim", "marks": 75},
            {"name": "Karim", "marks": 45},
            {"name": "Sima",  "marks": 82},
            {"name": "Riya",  "marks": 38}]
```

Question 8: List Comprehensions [7 Marks]

(a) Using a single list comprehension, create a list of squares of all even numbers from 1 to 20. [3 marks]

(b) Given words = ["hello", "world", "python", "is", "fun"], use a list comprehension to create a new list containing only the words longer than 4 characters, converted to uppercase. [4 marks]

Question 9: Functions [12 Marks]

(a) Write a function calculate_grade(marks) that takes a marks value and returns a grade: [4 marks]

- 80 and above → A+
- 70 – 79 → A
- 60 – 69 → B
- 50 – 59 → C
- Below 50 → F

(b) Write a function using *args that accepts any number of integers and returns their average. [4 marks]

(c) Using lambda functions: [4 marks]

- Write a lambda that returns the cube of a number
- Use map() with a lambda to get the square of each element in [1, 2, 3, 4, 5]
- Use filter() with a lambda to extract only even numbers from [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]

Question 10: Recursion [10 Marks]

(a) Write a recursive function to calculate the factorial of a number. Print the factorial of 5 and 7. [5 marks]

(b) Write a recursive function to generate Fibonacci numbers. Print the first 10 Fibonacci numbers. [5 marks]

Part C: Practical Problem [15 Marks]

Question 11: Student Result System [15 Marks]

Build a complete Student Result System with the following features:

1. A function add_student(name, marks_dict) that adds a student's information to a global list. The marks_dict should contain subject names as keys and marks as values.

2. A function calculate_average(marks_dict) that computes and returns the average marks across all subjects.

3. A function display_result(student) that neatly prints the student's name, marks for each subject, their average, and their grade (use the grade function from Q9).

4. Add at least 3 students with data and display all their results.

5. Bonus (2 extra marks): Using a list comprehension, print the names of all students who passed (average >= 50).

Submission Rules

- Submit either separate .py files per question, or one .py file with clearly labeled sections
- Add comments to your code explaining what each section does
- Include screenshots or copy-paste your terminal output along with your code
- Plagiarism will result in zero marks for all parties involved
- Deadline: Before the next class

Marks Summary: Part A = 40 | Part B = 45 | Part C = 15 | Total = 100

Good luck! Happy Coding!