Python for Computer Science and Data Science 1 (CSE 3651)

MINOR ASSIGNMENT-2: CONTROL STATEMENTS AND PROGRAM DEVELOPMENT

1. Write a program such that Python will ask you if it is raining or not. If your answer is ”yes”, Python will say ”Carry an umbrella”. If you type anything else, Python will say ”Bye”.

2. Write a program such that Python will ask you if it is raining or not. If your answer is ”yes”, Python will say ”Carry an umbrella”. If you say ”no”, Python will say ”No need to carry an umbrella”. If you type anything else, Python will say ”Bye”.

3. Write a Python program to calculate a student’s letter grade based on their numeric score using the following scale: A (90–100), B (80–89), C (70–79), D (60–69), and F (below 60). Additionally, provide a comment for each grade: ”Excellent” for A, ”Good” for B, ”Average” for C, ”Needs Improvement” for D, and ”Failing” for F.

4. Write a program that takes an integer input from the user and tells the user whether the number is even or odd.

5. Write a program that takes a year as input and determines whether it is a leap year or not.

6. Write a program that takes an integer input from the user and prints whether it is prime or not.

7. In line with the previous question, write a program to compute the sum of all prime numbers below a user input number, e.g., Sum of all prime numbers less than 20 is 77.

8. Write a program that takes an integer input from the user. Use a while loop to continuously prompt for input until the user enters a positive number. If the final number is even, multiply it by 2 and if it is odd, square it. Display the results at the end.

9. Write a program to find the remainder when a user input number is divided by 5 using match case. If the user inputs a non-integer, Python should say ”Invalid input” and stop.

10. Write a program that takes a string as input and prints out all possible sub-strings of the string using loops, e.g., if the input is ”abc”, the output should be ”a”, ”ab”, ”abc”, ”b”, ”bc”, ”c”.

11. Write a program that functions as a simple calculator. It should continuously accept a pair of numbers and an operator (+, -, *, /) from the user and print the result. If the user types ”exit,” the program quits. Otherwise the program continues asking for a pair of input numbers.

12. Write a program to find out the mean, median, and mode of 1, 2, 3, 2, 3, 4, 4, 4, 5, 4, 5, 6.

13. Positions on a chess board are identified by a letter and a number. The letter identifies the column, while the number identifies the row, as shown below in Figure 1:

    Write a program that reads a position from the user and identify the proper color of the respective box.

14. Write a Python program that calculates the final cost of a hotel booking based on the room type (Standard: $100/night, Deluxe: $150/night, Suite: $250/night), the length of stay (10% discount for $>$3 nights, 20% discount for $>$7 nights), the season (20% increase during peak season, 15% decrease during the off-season), and whether the customer is a loyalty member (5% additional discount). The program should output the final booking cost after applying all relevant discounts and adjustments.

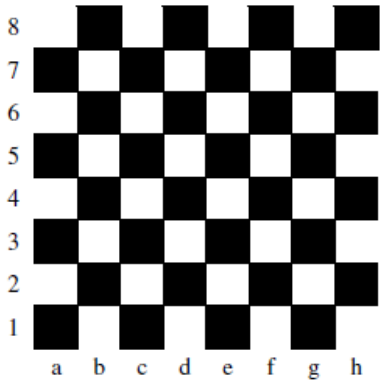

Figure 1: Chess board

15. Write a function to determine whether a given natural number is a perfect number. A natural number is said to be a perfect number if it is the sum of its divisors. For Example, 6 is a perfect number because 6 = 1+2+3, but 15 is not a perfect number because 15!= 1+3+5.

16. Write a function that finds the sum of the n terms of the following series:
    a) $1 - x^2/2! + x^4/4! - x^6/6! + \ldots + x^{2n}/(2n)!$

    b) $1 + x/1! + x^2/2! + x^3/3! + \ldots + x^n/n!$

    c) 1-3+5-7+9-...

17. Write a python program that displays all the numbers from 100 to 1,000, ten per line, that are divisible by 5 or 6. Numbers are separated by exactly one space.

18. Write a Python program that prints all numbers from 1 to 100, except multiples of 7, using a for loop with continue.

19. Write a python program that accepts a positive integer n and reverses the order of its digits, e.g., 1234 becomes 4321.

20. Write a python program that reads an integer and displays all its smallest factors in increasing order, e.g., if the input integer is 120, the output should be as follows: 2, 2, 2, 3, 5.

21. Write a python program to determine whether or not a number n is a factorial number.

22. Write a program that takes a number from the user and continuously sums its digits until the sum becomes a single-digit number.

23. Write a program to simulate a simple ATM withdrawal system. The user can enter an amount they want to withdraw, and the program will provide the number of 100, 50, 20, and 10 denomination notes required to dispense that amount. The program should check if the requested amount is a multiple of 10 and if the ATM has enough cash.

24. Write a program that reads an integer from the user and checks which digits (0-9) have appeared in the number. The program should print out the digits that have appeared, e.g. input=1234, output= ONE TWO THREE FOUR

25. Write Python programs using loops to print the following patterns:

* ** *** ****	* ** *** ****	**** *** ** *
**** *** ** *	**** *** ** *	* *** ***** ******* ***** *** *
* * * * * * * *********	* * * * * * * * * *	* * * * * * * * * * * * * * * *
0 1 2 3 4 5 0 1 2 3 4 0 1 2 3 0 1 2 0 1 0	1 3 3 5 5 5 7 7 7 7 9 9 9 9 9	1 2 1 3 2 1 4 3 2 1 5 4 3 2 1
1 2 4 3 6 9 4 8 12 16 5 10 15 20 25	A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\	1 2 1 2 3 2 1 2 3 4 3 2 1 2 3 4 5 4 3 2 1 2 3 4 5

Figure 2: Pattern printing