CSE 1321L: Programming and Problem Solving I Lab

Assignment 3 – 100 points

Solving Problems

What students will learn:

1) Problem solving

2) Write code that includes if/else statements

3) Design programs that leverage match/case logic

4) Using logic within loops

5) Nested loops (loops inside of loops)

6) Solve problems of increasing complexity

Assignment 3A: Pattern Generator

Write a Python program that prompts the user for a positive integer and prints a pyramid pattern with numbers.

Instructions:

1. Prompt the user for a positive number
2. Print out as many rows as that positive number indicates. For example, if the user enters 4, you'll print out 4 rows of numbers. If the user enters 15, you'll print out 15 rows of numbers.
3. Each row should be made up of numbers counting from 1 left to right. Each row should have exactly as many numbers on it as the row number. For example, row 1 will have 1 number, row 4 will have 4 numbers.

Sample Output:

[Note: Your program must work for any number entered]

```
Enter a positive number: 2
1
2 3
```

```
Enter a positive number: 4
1
2 3
4 5 6
7 8 9 10

Enter a positive number: 1
1
```

Assignment 3B: Text-Based Game

Write a Python program that creates a simple text-based adventure game. The user starts in a room and must choose a direction to move in. The program should:

Instructions:

1. Prompt the user to choose a direction: 'north', 'south', 'east', or 'west'.
2. Use a while loop to keep asking the user for input until they choose a valid direction.
3. Use if statements to check the user's input and respond with a different message for each direction: For example:
    - "You move north and find a river."
    - "You move south and discover a dense forest."
    - "You move east and encounter a mountain."
    - "You move west and stumble upon a cave."
4. Use a match statement (or if-elif) to decide what happens next based on the user's choice:
    - North: The user can choose to "swim" or "build a raft".
    - South: The user can choose to "climb a tree" or "walk deeper into the forest".
    - East: The user can choose to "climb the mountain" or "go around it".
    - West: The user can choose to "enter the cave" or "walk past it".
5. Prompt the user for the next action based on their previous choice, and print an appropriate response. For example:
    - If the user moves north and chooses to "swim", print "You swim across the river and find a hidden treasure."
    - If the user moves west and chooses to "enter the cave", print "You enter the cave and find a sleeping dragon."

6. Continue prompting the user until they decide to quit the game.

Sample Output:

```
You are in a room. Choose a direction to move in (north, south, east, west): north
You move north and find a river. What will you do? (swim/build a raft): swim
You swim across the river and find a hidden treasure.
Would you like to continue playing? (yes/no): yes
Choose a direction to move in (north, south, east, west): south
You move south and discover a dense forest. What will you do? (climb a tree/walk deeper): walk deeper
You walk deeper into the forest and find an abandoned cabin.
Would you like to continue playing? (yes/no): no
Thank you for playing!
```

Assignment 3C: Number Classification Grid

Create a Python program that fills a 5x5 grid with numbers from 1 to 25. The program should classify each number in the grid as either **even** or **odd** using loops and conditionals, and print the grid with its classification.

Instructions:

1. Use loops to fill a 5x5 grid with numbers from 1 to 25.
2. Use nested loops and conditional statements (if, if-else-if, or match) to classify each number as "E" for even or "O" for odd.
3. Print the 5x5 grid showing each number along with its classification.

Sample Output:

```
1(O) 2(E) 3(O) 4(E) 5(O)
6(E) 7(O) 8(E) 9(O) 10(E)
11(O) 12(E) 13(O) 14(E) 15(O)
16(E) 17(O) 18(E) 19(O) 20(E)
```

```
21(O) 22(E) 23(O) 24(E) 25(O)
```

Submission:

1. You will submit 3 separate files containing source code – one for each of the assignments above.
2. Upload all 3 files (simultaneously) to the assignment submission folder in Gradescope.