CSC107 2.0 Computer Programming - Laboratory I
Lab sheet 10

To understand and practice the use of **NESTED FOR** loop, **CONTINUE**, **BREAK** through simplified real-world scenarios.

1. Complete the below code to print 10 numbers and execute it.

```
#include <stdio.h>

int main() {
   // Display the table heading
   printf(" Multiplication Table\n");

   // Display the number title
   printf("   ");
   for (int j = 1; j <= 9; j++)
      printf(.....);

   printf("\n———————————————————————————————————————————————————————————\n");

   // Display table body
   for (int i = 1; i <= 9; i++) {
      printf(……..);
      for (int j = 1; j <= 9; j++) {
         // Display the product and align properly
         printf(.....);
      }
      printf("\n");
   }

   return 0;
}
```

2. How many times is the printf statement executed?

```
for (int i = 0; i < 10; i++)
        for (int j = 0; j < i; j++)
                printf(“%d”,i * j)
```

3. Use nested loops that display the following patterns in four separate programs.

```
Pattern A          Pattern B          Pattern C          Pattern D
1                  1 2 3 4 5 6                 1          1 2 3 4 5 6
1 2                1 2 3 4 5                 2 1            1 2 3 4 5
1 2 3              1 2 3 4                 3 2 1              1 2 3 4
1 2 3 4            1 2 3                 4 3 2 1                1 2 3
1 2 3 4 5          1 2                 5 4 3 2 1                  1 2
1 2 3 4 5 6        1                 6 5 4 3 2 1                    1
```

4. Write a program that prints a table of squares and cubes for the numbers 1 to 10.

```
Number   Square   Cube
1        1        1
2        4        8
3        9        27
4        16       64
...
10       100      1000
```

5. Write a program that prompts the user to enter an integer from 1 to 15 and displays a pyramid.

6. Write a program that prompts the user to enter a character and the number of rows, then displays a diamond shape with the character.

```
   A
  B B
 C   C
D     D
 C   C
  B B
   A
```

7. Write a program that prompts the user to enter a character and the number of rows, then displays a diamond shape with the character.

8. Assume that you have to build a simple movie ticket booking system. You need to implement a movie ticket booking system that allows users to select and book seats in a 5x5 theater. First, you should display the seating arrangement. Represent available seats with `O` and booked seats with `X`, ensuring the proper labeling of rows (A-E) and columns (1-5). Next, handle user input by prompting the user to enter a seat to book or `Q` to quit. Validate the input to ensure it corresponds to a valid seat (e.g., A1, B2). Once a valid seat is selected, check if the seat is already booked. If not, mark the seat as booked and update the seating chart accordingly. Finally, allow the user to exit the system by entering `Q`.
   Further you ensure that the program correctly identifies and prevents double booking of seats. Also, display a message confirming the booking of the selected seat.

```
Seating Chart:
  1 2 3 4 5
A O O O O O
B O O O O O
C O O O O O
D O O O O O
E O O O O O
Enter seat to book (e.g., A1, B2) or Q to quit: D3
Seat D3 booked successfully!
Seating Chart:
  1 2 3 4 5
A O O O O O
B O O O O O
C O O O O O
D O O X O O
E O O O O O
Enter seat to book (e.g., A1, B2) or Q to quit: Q
Exiting the booking system. Goodbye!
```

End