

# Practical

## Repetition

**for loops :**

A for loop is used to count a set number of times. The following for loop uses a variable x to store the count and a boolean expression to terminate the loop when the value of x reaches 5.

```
int x = 0;
for(x = 0; x < 5; x++)
{
    Console.WriteLine("x = " + x);
}
```

- The value of x is initialised to 0.
- A test is performed to check if the current value of  $x < 5$ .
- If the test is true, the body of the for loop defined by the '{' and '}' is executed. In this case the value of x is printed to the screen, then the value of x is incremented by 1 (x++) and the process repeats again.
- If the test is false the for loop terminates.

The output from the for loop will be :

```
x = 0
x = 1
x = 2
x = 3
x = 4
```

We start counting from 0 because later when we start using arrays the first value in the array is in position 0.

**While loops :**

A while loop is generally used to provide repetition for an unknown number of times but it can be used like a for loop.

The following while loop performs the same processing as the for loop defined above:

```
int x = 0;
while(x < 5)
```

```
{
    Console.WriteLine("x = " + x);
    x++;
}
```

- The value of x is initialised to 0.
- A test is performed to check if the current value of  $x < 5$ .
- If the test is true the body of the while loop defined by the '{' and '}' is executed. In this case the value of x is printed to the screen, then the value of x is incremented by 1 (x++) and the process repeats again.
- If the test is false the while loop terminates.

The following while loop will loop an unknown number of times and depends on the user input to terminate the loop.

```
string tempVal = "";
int x = 0;
while(x >= 0)
{
    Console.Write("Enter a number >");
    tempVal = Console.ReadLine();
    x = Int32.Parse(tempVal);
    Console.WriteLine("x = " + x);
}
```

- The value of x is initialised to 0. This ensures the while is executed at least once.
- A test is performed to check if the current value of x is  $>$  or  $= 0$  meaning that while the value of x is not negative the loop will continue.
- If the test is true the body of the while loop defined by the '{' and '}' is executed. In this case the user is prompted to enter a value. The value is converted to an integer and stored in the variable x then printed to the screen.
- If the test is false the while loop terminates.

**Questions 1 :** Practice writing for and while loops by completing the following:

1. Create a new project prac\_q1
2. Write the code that uses a for loop to count from 0 to 10 and display the count to the screen.
3. Add the code that uses a for loop to count from 10 to 0 and display the count to the screen.

4. Add the code that uses a while loop to count from 0 - 10 and display the count to the screen.
5. Add the code that uses a while loop to count from 10 - 0 and display the count to the screen.

**Question 2 :** Using the following code adjust the code to include the following:

- Add a while loop that redisplay the menu and allows the user to select another option until the user selects the exit option of 4.

```
using System;
namespace prac_Q2
{
    class menu
    {
        static void Main(string[] args)
        {
            int response = 0;
            string tempVal = "";
            bool parseAttempt = false;

            Console.WriteLine("1. Make a phone call");
            Console.WriteLine("2. Send an SMS");
            Console.WriteLine("3. Find a contact");
            Console.WriteLine("4. Quit");
            Console.Write("Enter your selection > ");

            tempVal = Console.ReadLine();
            parseAttempt = Int32.TryParse(tempVal, out response);

            if (parseAttempt == false)
            {
                response = 0;
            }

            switch (response)
            {
                case 1 :
                    Console.WriteLine("User selected to make a phone call, option " +
response);
                    break;
                case 2 :
                    Console.WriteLine("User selected to send an SMS, option " +
response);
                    break;
                case 3 :
                    Console.WriteLine("User selected to find a contact, option " +
response);
                    break;
                case 4 :
                    Console.WriteLine("User selected to Quit, option " + response);
```

```

        break;
    default :
        Console.WriteLine("Unknown selection, option " + response);
        break;
    }
    Console.ReadLine();
}
}
}

```

**Question 3 :** Using for loops draw the following shape (or something similar) to the screen.

Use For loop to draw the \* character where required.

```

        *
      ***
    *****
  *********
 *****
  *****
    ***
      *

```