C# Do and While Loops

Loops enable a piece of code to run again and again. This is a good thing because it enables a single section of code to run more than once plus we can work with sets of data. This reduces the amount of code needing to be written and reduces mistakes as there are less lines of code to go wrong.

This piece of code will run again and again until the letter q is entered.

```
char quit = 'a';
String input, shortInput;
do
{
      Console.WriteLine("Please enter any character except q");
      input = Console.ReadLine();
      Console.WriteLine("You entered " + input);
      shortInput = input.Substring(0,1);
      quit = Char.Parse(shortInput);
      Console.WriteLine("1st letter of input is " + shortInput);
} while (quit != 'q');
```

There are 2 similar loops the do and the while

```
do
{
} while (condition);
```

This is not the same as

```
while (condition)
{
}
```

A Do loop will always run at least once even if the condition is false because the condition is tested at the end of the loop.

```
int num = 2;
do
{ //this will run
       Console.WriteLine("Loop running num is " + num);
} while (num > 3);
```

A while loop tests the condition before the loop so may not run at all.

```
int num = 2;
while(num>3)
{ //this will not run
       Console.WriteLine("Loop running num is " + num);
} while (num > 3);
```

Often a loop will be set to run with a counter inside the loop that will control how long it runs for.

```
int num = 0;
do
{
      num += 1;
      Console.WriteLine("Loop running num is " + num);
} while (num < 10);
Console.WriteLine("Final value of num is " + num);
```

A loop can be set to run an infite number of times. This is not a good plan.

```
int num = 0;
do
{
      Console.WriteLine("Loop running num is " + num);
} while (num < 10);
Console.WriteLine("Final value of num is " + num);
```

To get out of jail free with this program hit Ctrl_Break. If the loop running message were not output the user would only see a blank screen but C# would be busy, busy in the background.

Examples

How many times (if any) will the following loops run, some may run forever:

`int num = 2;`
`do`
`{`
`  num++;`
`} while (num > 3);`
	`int num = 2;`
	`while (num > 3)`
	`{`
	`  num++;`
	`}`

`int num = 2;`
`do`
`{`
`  num = num *2;`
`} while (num < 10);`
	`int num = 2;`
	`do`
	`{`
	`  num ++;`
	`} while ((num < 10) && (num > 1));`

`int num = 2;`
`do`
`{`
`  num --;`
`} while (num < 10);`
	`int num = 2;`
	`do`
	`{`
	`  num ++;`
	`} while ((num < 10) || (num > 1));`

`int num = 2;`
`do`
`{`
`  num = num * 5;`
`} while (num < 10);`
	`int num = 2;`
	`while ((num < 10) && (num > 1));`
	`{`
	`  num ++;`
	`}`

Exercises:

1. Set up a menu program with 6 choices of character input. Entering Q will cause the program to quit. The other 5 choices will output a different message (such as “Thank you for pressing the ~ key”). If a key other than one of the 6 menu choices is selected the output should output a message (for example “that is nota valid key input”). The program should accept upper and lower case versions of the menu characters where letters are used.

2. Ask the user for a number and output a message that number of times.

3. Ask for a sequence of numbers then output the sum and mean of the numbers. The user should enter x as a signal that no more numbers are expected

4. In an election for the Student Union President there are three candidates, Susan, Peter and Imran. Using a 1 for Susan's vote, 2 for Peter, 3 for Imran and 0 for a spoilt paper, find the total number of votes, the percentage of the vote for each candidate, the number of and percentage of spoilt papers. To terminate your data input use a rogue value of -1. Use about 20 items of data.

5. The personnel department of a factory wishes to find the number of workers it employs in each of the following age groups:-

    a. Over 64 years of age,

    b. From 21 to 64 years of age inclusive,

    c. From 16 to 20 years of age inclusive,

    Write a program to allow a number of values representing the ages to be input from the keyboard and to output the number of workers in each age group. Use a rogue value loop.