EXERCISE 1

The tasks in the first part of this section are step by step instructions as to how choices can be programmed in C#. This is followed by a number of tasks for you to complete by applying the knowledge that you have previously gained

TASK 1: CREATING A PROGRAM TO PRINT A NUMBER AS A WORD

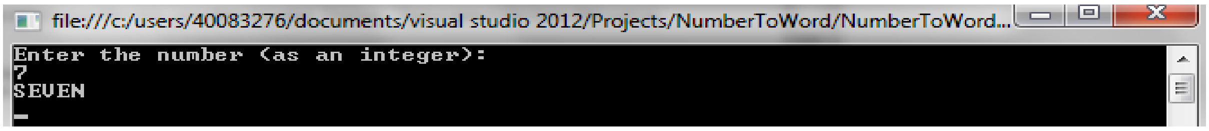
A program is required to print "ONE", "TWO", ... , "NINE" if the integer entered is between 1 and 9. If anything other than 1 to 9 is entered then an error message is displayed.

Step 1: `Open` the `Visual Studio File` menu, and then select `New` (or press `Ctrl + Shift + N`). Then `click` on `Project` and name it e.g. `Prac03NumberToWord`.

Step 2: Type the following code into the `NumberToWord` class and complete the other else if statements:

```
static void Main(string[] args)
{
    Console.WriteLine("Enter the number (as an integer): ");
    int number=Convert.ToInt32(Console.ReadLine());
    if (number == 1)
    {
        Console.WriteLine("ONE");
    }
    else if (number == 2)
    {

    }
```

Step 3: Complete the missing parts of the program. Save the class (`CTRL + Shift + S`) and run the program. Shown below is example output.


file:///c:/users/40083276/documents/visual studio 2012/Projects/NumberToWord/NumberToWord...

```
Enter the number (as an integer):
7
SEVEN
_
```

Step 4:

You should aim to test your program with the following:

- All nine integers between 1 and 9.
- A few other integers outside this range i.e. 10 and 100.
- What happens if you enter -5? How can you add an error message to catch this?
- What happens if you enter a letter e.g. a? How can you add an error message to catch this? Hint: we normally use a try-catch block to catch the error. Don’t worry if you are unable to complete this now, we will look at it in more detail later on in the course.

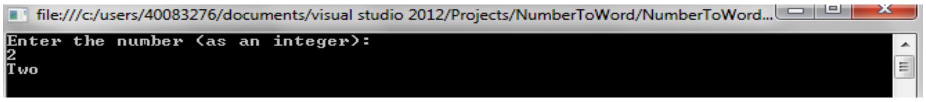
TASK 2: USING "SWITCH-CASE "

Step 1: Create a new project(C# Console Application) and name it Prac3Task2.

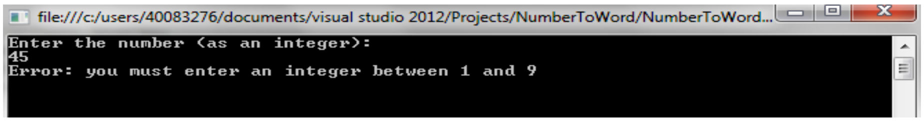
Step 2: In the Program.cs write the code shown below and complete the rest of the case statements up to 9.

```
Console.WriteLine("Enter the number (as an integer): ");
int number=Convert.ToInt32(Console.ReadLine());

switch (number)
{
    case 1: Console.WriteLine("One"); break;
    case 2: Console.WriteLine("Two"); break;
    default: Console.WriteLine("Error: you must enter an integer between 1 and 9"); break;
}

Console.Read();
```

Step 3: Save the class (CTRL +Shift+ S) and run the program. Expected output is shown below.


file:///c:/users/40083276/documents/visual studio 2012/Projects/NumberToWord/NumberToWord...

```
Enter the number (as an integer):
2
Two
```


file:///c:/users/40083276/documents/visual studio 2012/Projects/NumberToWord/NumberToWord...

```
Enter the number (as an integer):
45
Error: you must enter an integer between 1 and 9
```

Step 4:
You should aim to test your program again with the following:

1. All nine integers between 1 and 9.

2. A few other integers outside this range i.e. 10 and 100.

3. What happens if you enter -5? How can you add an error message to catch this?

4. What happens if you enter a letter e.g. a? How can you add an error message to catch this?

Hint: we normally use a try-catch block to catch the error. Don't worry if you are unable to complete this now, we will look at it in more detail later on in the course.

TASK 3: USING A "SWITCH-CASE"

Write a program similar to the switch statement used above called which prints "Sunday", "Monday", ... "Saturday" if an integer entered is 0, 1, ..., 6, respectively. Otherwise, it should print "Not a valid day".

TASK 4: WHAT'S WRONG WITH THE CODE?

What is wrong with the following two code fragments? Provide a corrected version for each.

```
Switch (n) {

      case 1: Console.WriteLine(" The number is 1" );

      case 2: Console.WriteLine ( " The number is 2" ); break;

      default: Console.WriteLine (" The number is not 1 or 2 " );

      break;

}
```

……………………………………………………………………………

```
Switch (n) {

      Case 1: Console.WriteLine ( " A " ); break;

      case2: Console.WriteLine ( " B " ); break;

      Default: Console.WriteLine ( " C " ); break;

}
```

TASK 5: WHAT'S THE ERROR?

What is the error in the "if statement" below? Remember to try working this out on paper as a trace and then input the code into Visual Studio and run it to see if you are correct. Then see if you can fix the code.

```
if (number == 50);{

      Console.WriteLine("Number is 50");

}
```

TASK 6: WHAT'S THE ERROR?

Can you spot the errors in the "if statement" below? Remember to try working this out on paper and then input the code into Visual Studio and run it to see if you are correct. Then see if you can fix the code.

```
if number >== 50 and number <== 100{

      Console.WriteLine("Number is more than or equal to 50 and less
      than or equal to 100 ");

}
```

TASK 7: WHAT'S THE OUPUT?

What is the output of the following code fragments? Work it out on paper first and then code it in C# to check your conclusions.

```
int height = 13;

if ( height <= 12 )
      Console.WriteLine("Low bridge: ");
      Console.WriteLine ("proceed with caution.");

int sum = 21;

if ( sum != 20 )
      Console.WriteLine ("You win ");
else
      Console.WriteLine ("You lose ");
      Console.WriteLine ("the prize.");

int sum = 7;

if ( sum > 20 ) {
      Console.WriteLine ("You win ");
} else {
      Console.WriteLine ("You lose ");
}
      Console.WriteLine ("the prize.");
```

EXERCISE 2

TASK 8: CALCULATING THE HEATING TIME

A microwave oven manufacturer recommends that when heating two items, add 50% to the heating time, and when heating three items double the heating time. Heating more than three items at once is not recommended.

Write a program that asks the user for the number of items and the single-item heating time. Perform the calculation, and print out the recommended heating time.

TASK 9: WHAT ARE THE ERRORS?

Can you spot the errors in the code below? Remember to try working this out on paper and then input the code into Visual Studio as C# and run it to see if you are correct. Then see if you can fix the code.

```
public class Score {

     public static void main(String[] args) {

     double score = 50.5;

     if score >= 40{

           Console.WriteLine("You passed the exam!");

      } else score < 40{

           Console.WriteLine("You failed the exam!");

      }

      }

}
```

TASK 10: USING A “SWTCH-CASE”

Write a program that will analyse the value of a district and using a Switch statement will print out the postcode. You can base your switch statement on the following values: South Belfast, BT7; Armagh, BT60; Ballymena, BT43; Omagh, BT78; Craigavon, BT62; Bangor, BT19 and Carrickfergus, BT38.

EXERCISE 3

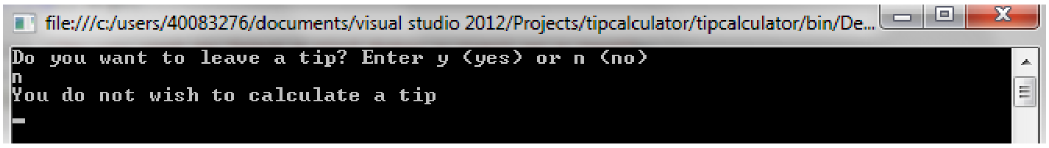
TASK 11: CREATE A TIP CALCULATOT

Examine the program below. It is designed to be a tip calculator. Some code is missing. The program should ask the user if they wish to calculate a tip. If they do not, the program will end. If they do wish to calculate a tip the program should do the following:

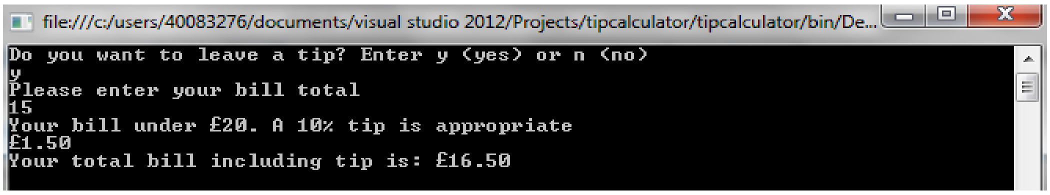
- It should ask the user to enter the value of the bill they want to calculate the tip for.
- It should then check if the value entered is more than or equal to £20. If it is it will add a tip of 20% to the total bill and output the new bill.
- If the bill is under £20 it will add a tip of 10% to the bill and output the new bill.
- Create a new class called `TipCalculator` and enter the code below into it, filling in the blanks so the program works properly.

Comments in green throughout the program indicate where you need to write code .

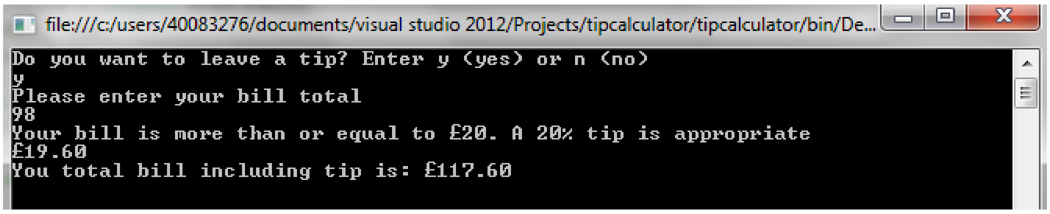
```
class Program
    {
        static void Main(string[] args)
        {
            Console.WriteLine ("Do you want to leave a tip? Enter y (yes) or n (no)");
            String choice = Console.ReadLine();
            double bill, tip;
            //ADD IF STATEMENT HERE TO CHECK IF THE USER INPUT WAS EQUAL TO y
            {
                Console.WriteLine ("Please enter your bill total");
                bill = Convert.ToDouble(Console.ReadLine());
                //ADD IF STATEMENT HERE TO CHECK IF BILL WAS MORE THAN OR EQUAL TO £20
                {
                     Console.WriteLine ("Your bill is more than or equal to £20. A 20%
                     tip is appropriate");
                   //WORK OUT WHAT 20% OF THE BILL IS AND PLACE RESULT IN TIP VARIABLE

                   //PRINT TIP TO 2 DECIMAL PLACES HERE

                   //ADD TIP TO BILL VARIABLE HERE

                   Console.WriteLine("You total bill including tip is: £" + bill);

                   else {
                   Console.WriteLine("Your bill under £20. A 10% tip is appropriate");
                  //WORK OUT WHAT 10% OF THE BILL IS AND PLACE RESULT IN TIP VARIABLE
                  //PRINT TIP TO 2 DECIMAL PLACES HERE

                  //ADD TIP TO BILL VARIABLE HERE

                  Console.WriteLine("Your total bill including tip is: £" +bill);
                  }
                 }
                 else {
                     Console.WriteLine("You do not wish to calculate a tip");
                 }

            Console.Read();

        }
    }
```


file:///c:/users/40083276/documents/visual studio 2012/Projects/tipcalculator/tipcalculator/bin/De...

```
Do you want to leave a tip? Enter y (yes) or n (no)
n
You do not wish to calculate a tip
_
```


file:///c:/users/40083276/documents/visual studio 2012/Projects/tipcalculator/tipcalculator/bin/De...

```
Do you want to leave a tip? Enter y (yes) or n (no)
y
Please enter your bill total
15
Your bill under £20. A 10% tip is appropriate
£1.50
Your total bill including tip is: £16.50
```


file:///c:/users/40083276/documents/visual studio 2012/Projects/tipcalculator/tipcalculator/bin/De...

```
Do you want to leave a tip? Enter y (yes) or n (no)
y
Please enter your bill total
98
Your bill is more than or equal to £20. A 20% tip is appropriate
£19.60
You total bill including tip is: £117.60
```

TASK 12: CALCULATING THE TOTAL BILL

Design and then code a solution that could be used by a supermarket to calculate a customer's total bill and apply any discounts the customer is entitled to.

You will need to create a `SuperMarket` class which should contain the following:

- A method called `scan()` which adds the price of an individual item to the total bill.
- A method called `discounts)` which checks if the user is entitled to any discounts (details of discounts below).
- A method called `getBill()` which returns the total bill.

You will need to create an object within the `Program.cs` that will allow you to call and test your methods . Call this object `customer1.`

You will need to call the scan method to add the price of an individual item to the bill. You can call the scan method several times to add several different prices to your total bill. After you have finished, call the discounts method to make deductions.

Finally you will call your `getBill` method to print out the total bill after discounts have been made.

Discount details

- In your discounts method you will need to check if the user is entitled to any of the following discounts:
- Customers with **a loyalty card** will receive a **10% reduction** in their total bill.
- Customers with a **£5 voucher** will receive a **£5 reduction** in their total bill.
- Customers with a **£10 voucher** will receive a **£10 reduction** in their total bill.

Customers can only use one voucher per transaction. They may use this voucher in conjunction with their loyalty card if they have one.

TASK 13: UPDATING YOUR EMPLOYEE CLASS

Go back to Practical 2, Task 7. In the Employee Class, add a new method - `tax(),` which calculates how much tax is deducted from the Employees annual pay.

- If the salary is **over 9000 and below 20000**, take **15%** off
- If the salary is **over 20000**, take **25%** off
- If the salary is **below 9000**, deduct **0%,** and output – **“You don’t have to pay tax!”**

Use `if…else if statements`, and test with different salaries in the `Program class`.