1. Calculate Charge (based on Age)

Create and test a new Java Application called **Charge** that implement the following algorithm:

```
Get age from user
Set charge to 20.00 (assume adult)
If age less than 18  then
    Set charge to 15.00
End if

Display Charge (with appropriate message)
```

2. Odd or Even

Design and write a program that asks the user for a number and indicates if the number is "odd" or "even".

Hint: Even numbers have a reminder of 0 (zero) when divided by 2.

3. Paper exercise - No programming. What output would you expect from the following?

a)
```
int count = 11;
while (count > 0 )
{
     System.out.println("count is " + count);
     count--;
}
```

b)
```
int count = 0 ;
while (count < 10 )
{
     System.out.println("count is " + count);
     count++;
}
```

c)
```
int count = 1 ;
while (count++ < 11 )
{
     System.out.println("count is " + count);
}
```

4. Counting Numbers

a) Write an algorithm (a series of steps required to achieve a desired result) to prompt the user to enter a series of integers (each on a separate line). The input is to be terminated with the value zero. Once the user has entered zero, display the number (count) of negative and positive values.

b) Write and test a program called CountNums, with a main method that implements the algorithm developed above.

5. Range Validation

a) Write a program to input a number between 1 and 100. The user should be asked to re-enter the number if it outside of the range.

b) Prepare a test plan (using example below) and test your program.

Test Value	Purpose of test	Expected Result	Actual Result
55	Valid number.	Accepted	
999	Invalid input	Rejected	
…	…	…	…

6. Commission

Commission is calculated using the following rules:

- Sales staff are paid 10% commission based on their total sales.
- Staff who have sold more than 50 items receive a Bonus Commission (an additional 25% of the commission amount).

a) Write pseudo code or develop a flowchart for the above:
   - Assume the total sales and number of items will be input by the user (see example below).
   - Use the basic form of the if statement (no **else** part).
b) Test your pseudo code or flowchart.
c) Ask your tutor to check your pseudo code or flowchart.
d) Implement the program using Java
e) Test the program.

Examples of the program executing - the inputs are underlined:

Run 1:

```
Enter total sales: 1000
Enter number of items sold: 35

Commission: 100
```

Run 2:

```
Enter total sales: 1500
Enter number of items sold: 60

Commission: 150
Bonus Commission: 37.5
Total Commission: 187.5
```

7. Temperature Conversion

Design and write a program to convert temperatures between Fahrenheit and Celsius. The program will require two inputs: type of conversion (F for Fahrenheit-to-Celsius and C for Celsius-to-Fahrenheit) and then the current temperature value.

The formulas are:

Fahrenheit = Celsius x 9 / 5 + 32

Celsius = (Fahrenheit -32) x 5 / 9

8. Loan Balance

Write a program that calculates the remaining balance on a loan. The program should prompt the user to enter a loan amount and the monthly payment, and then display a list of monthly balances. The process should repeat until the user enters a negative number for the loan amount. For example:

```
Loan Amount: 300
Repayment Amount: 50

Month 1: £250
Month 2: £200
Month 3: £150
Month 4: £100
Month 5: £50
Month 6: £0
```

Optional: Display the Balance as Year 1, Month 1: £xxx

9. Leap Year

Using a flowchart or pseudo-code to design the steps required to find out if a year is a leap year:

Prompt the user to input a year, print out a message stating the year was or was not a leap year. Leap years occur if the year is divisible by 4, except for the century years.

Only the centuries divisible by 400 are leap years. e.g. 1900 was not a leap year; 2000 was a leap year.

Implement your flowchart or pseudo-code in Java