

Q1.


Write a program to take a depth (in kilometers) inside the earth as input data; compute and display the temperature at this depth in degrees Celsius and degrees Fahrenheit. The relevant formulas are

$$\text{Celsius} = 10 * \text{depth} + 20$$

$$\text{Fahrenheit} = 1.8 * \text{Celsius} + 32$$

Include two functions in your program. Function `celsius_at_depth` should compute and return the Celsius temperature at a depth measured in kilometers. Function `fahrenheit` should convert a Celsius temperature to Fahrenheit.

Sample run:

 C:\Users\m_bah\Desktop\TEDU\CMPE252\recitation_1_1\main.exe

```
Enter the depth:
```

```
5
```

```
Celcius degree: 70.00
```

```
Fahrenheit degree: 158.00
```


```
Process returned 0 (0x0)   execution time : 5.249 s
```

```
Press any key to continue.
```

Q2.

An integer n is divisible by 9 if the sum of its digits is divisible by 9. Develop a program which takes an integer number and displays sum of its digits. Your program should also determine whether or not the number is divisible by 9 by checking whether the sum of digits is divisible by 9.

Sample run:

 C:\Users\m_bah\Desktop\TEDU\CMPE252\recitation_1_2\bin\Debug\recitation_1_2.exe

```
Enter an integer:6215940
Sum of the digits: 27
Divisible by 9: Yes
Process returned 0 (0x0)   execution time : 2.561 s
Press any key to continue.
```

Test it on the following numbers:

N = 154368

N = 6215940

N = 12345


Q3.

Write a program which takes three numbers:

- the number of people in a town
- the percentage by which the population increases each year
- a threshold value

Write a loop that displays the annual population and determines how many years it will take for the population to surpass the threshold value. Use round function from math.h library to find the population after each year.

Sample run:

 C:\Users\m_bah\Desktop\TEDU\CMPE252\recitation_1_3\main.exe


```
Enter the population:
100
Enter the percentage:
10
Enter the threshold:
288
Population after 1. year: 110
Population after 2. year: 121
Population after 3. year: 133
Population after 4. year: 146
Population after 5. year: 160
Population after 6. year: 176
Population after 7. year: 193
Population after 8. year: 212
Population after 9. year: 233
Population after 10. year: 256
Population after 11. year: 281
Population after 12. year: 309
Total years to surpass the threshold value: 12

Process returned 0 (0x0)   execution time : 16.155 s
Press any key to continue.
```

Q4.

Write a program to process a collection of the speeds of vehicles. Your program should count and print the number of vehicles moving at a high speed (higher than 90 miles/hour), the number of vehicles moving at a medium speed (50-90 miles/hour), and the number of vehicles moving at a slow speed (less than 50 miles/hour). It should also display the category of each vehicle. The end of the input is indicated by the sentinel value -99.

Sample run:

 C:\Users\m_bah\Desktop\TEDU\CMPE252\recitation_1_4\main.exe

```
Enter the speeds:
43 23 54 57 68 67 51 90 33 22 11 88 34 52 75 12 78 32 89 14 65 67 97 53 10 47 34 50 -99
Vehicle 1 have a slow speed.
Vehicle 2 have a slow speed.
Vehicle 3 have a normal speed.
Vehicle 4 have a normal speed.
Vehicle 5 have a normal speed.
Vehicle 6 have a normal speed.
Vehicle 7 have a normal speed.
Vehicle 8 have a normal speed.
Vehicle 9 have a slow speed.
Vehicle 10 have a slow speed.
Vehicle 11 have a slow speed.
Vehicle 12 have a normal speed.
Vehicle 13 have a slow speed.
Vehicle 14 have a normal speed.
Vehicle 15 have a normal speed.
Vehicle 16 have a slow speed.
Vehicle 17 have a normal speed.
Vehicle 18 have a slow speed.
Vehicle 19 have a normal speed.
Vehicle 20 have a slow speed.
Vehicle 21 have a normal speed.
Vehicle 22 have a normal speed.
Vehicle 23 have a high speed.
Vehicle 24 have a normal speed.
Vehicle 25 have a slow speed.
Vehicle 26 have a slow speed.
Vehicle 27 have a slow speed.
Vehicle 28 have a normal speed.
High speed vehicle count: 1
Normal speed vehicle count: 15
Slow speed vehicle count: 12

Process returned 0 (0x0)   execution time : 6.852 s
Press any key to continue.
```

Q5.

Fibonacci numbers (0 1 1 2 3 5 8 13 ...) are defined as follows:


0th Fibonacci number is 0.

1st Fibonacci number is 1.

nth Fibonacci number (where $n > 1$) is the sum of (n-1)th Fibonacci number and (n-2)th Fibonacci number.

Write a function which takes an integer n and returns nth Fibonacci number. Provide an iterative solution.

Sample run:

 C:\Users\m_bah\Desktop\TEDU\CMPE252\recitation_1_5\bin\Debug\recitation_1_5.exe

```
Enter the number:
```

```
8
```

```
8. fibonacci number is: 21
```

```
Process returned 0 (0x0)   execution time : 1.846 s
```

```
Press any key to continue.
```