Practice 2

1. **Salary** Write a program that prompts the user to enter the number of hours an employee has worked, and displays the salary due. Salary is paid at an hourly rate of RM 12.00 for up to 40 hours of work. The hourly rate increases to RM 18.00 for overtime. Here is a sample run:

```
Enter the number of hours worked: 42
Salary due = RM 516.0
```

```
Enter the number of hours worked: 32
Salary due = RM 384.0
```

2. **Body Mass Index (BMI)** Body mass index (BMI) is a measure of health based on height and weight. It can be calculated by taking your weight in kilograms and dividing it by the square of your height in meters. The interpretation of BMI is as follows:

BMI	Interpretation
BMI < 18.5	Underweight
18.5 <= BMI < 25.0	Normal
25.0 <= BMI < 30.0	Overweight
30.0 <= BMI	Obese

Write a program that prompts the user to enter a weight in pounds and height in inches and displays the BMI. Note that one pound is 0.45359237 kilograms and one inch is 0.0254 meters. Here is a sample run:

```
Enter weight in pounds: 95.5
Enter height in inches: 50
BMI is 26.8573
You are overweight
```

3. **Quadratic equations** The two roots of a quadratic equation $ax^2 + bx + c = 0$ can be obtained using the formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Where $b^2 - 4ac$ is called the discriminant of the quadratic equation. If the discriminant is positive, then the equation has two distinct real roots. If the discriminant is zero, the equation has only one root. If it is negative, the equation has no real roots.

Write a program that prompts the user to enter values for a, b, and c and displays the result based on the discriminant. If the discriminant is 0 or positive, display the root(s). Otherwise, display "The equation has no real roots." Here are some sample runs:

```
Enter a, b, and c: 1 3 1
The equation has two roots -0.381966 and -2.61803
```

```
Enter a, b, and c: 1 2 1
The equation has one root -1.0
```

```
Enter a, b, and c: 1 2 3
The equation has no real roots
```

4. **Leap year** A year is said to be a leap year if it is divisible by 4 but not by 100, or if it is divisible by 400. Write a program that prompts the user to enter a year and displays whether the year is leap. Here is a sample run:

```
Enter a year: 2016
2016 is a leap year
```

```
Enter a year: 1900
1900 is not a leap year
```

5. **Future day** Write a program that prompts the user to enter an integer for today's day of the week (Sunday is 0, Monday is 1, ... , and Saturday is 6). Also prompt the user to enter the number of days after today for a future day and display the future day of the week. Here is a sample run:

```
Enter today's day: 1
Enter the number of days elapsed since today: 3
Today is Monday and the future day is Thursday
```

```
Enter today's day: 0
Enter the number of days elapsed since today: 31
Today is Sunday and the future day is Wednesday
```

6. **Number of days** Write a program that prompts the user to enter the month and year and displays the number of days in the month. For example, if the user entered month 2 and year 2012, the program should display that February 2012 has 29 days. If the user entered month 3 and year 2015, the program should display that March 2015 has 31 days.