SEHH2042 Computer Programming

Tutorial 2 – Selection statements

Q1. Write a program **Digit.cpp** that asks the user to input a two-digit integer (00 – 99) and displays the comparison result of the two digits. Use data type **integer** for all data values.

Sample result 1:

```
Enter a two-digit integer (00 - 99): 48
4 < 8
```

Input value is highlighted in ***bold and italic***.

Sample result 2:

```
Enter a two-digit integer (00 - 99): 52
5 > 2
```

Sample result 3:

```
Enter a two-digit integer (00 - 99): 99
9 = 9
```

Hint: You may use the remainder operator (modulus, %) in your calculation.

Think about the following first:

(1) What header files/library are required?
(2) How many variables are needed?
(3) What is/are the data type(s) of variable(s)?
(4) What are the steps and calculations involved?

Follow the steps below to write the program:

1. Include necessary header files/library and implement the program similar to T1 Q5.

```
#include <iostream>
using namespace std;
```

```
int main()
{
    // Similar to T1 Q5
    // Declare necessary variables
    // Prompt for user input of a value into variable n
    // Separate the digits by calculation
    // Display result

    return 0;
}
```

2. Declare necessary variables.

```
int n, digit1, digit2;
```

Prompt message is displayed using cout.
Input value is accepted using cin.

3. Prompt for user input of a value in meter.

```
cout << "Enter a two-digit integer (00 - 99): ";
cin >> n;
```

4. Separate the digits by calculation.

```
digit1 = n / 10;
digit2 = n % 10;
```

```
     4   ← (48 / 10 = 4)
10 ) 48
    40
     8   ← (48 % 10 = 8)
```

5. Compare the two digits and display the corresponding result.

```
if (digit1 > digit2)
     cout << digit1 << " > " << digit2;
else if (digit1 < digit2)
     cout << digit1 << " < " << digit2;
else
     cout << digit1 << " = " << digit2;
```

else does not require condition, need to use if after else.

The last else means "otherwise of the above", which implies (digit1 == digit2)

Q2. Write a program **Factor.cpp** that prompts user to input two integers *x* and *y*, and checks whether *x* is a factor of *y*. **Use if-else statement in your answer.**

Sample result 1:
```
Input x: 12
Input y: 36
12 is a factor of 36
```

Sample result 2:
```
Input x: 123
Input y: 45
123 is not a factor of 45
```

```
if (factor condition)
     display "Yes"
else
     display "No"
```

Modify your program by using **conditional operator**.

Q3. Write a program **LeapYear.cpp** that prompts user to input a year, and checks whether it is a leap year. A year is a leap year if it is divisible by 4 but not by 100, or if it is divisible by 400. **Use if-else statement in your answer.**

Sample result 1:
```
Input a year: 2016
Is 2016 a leap year? Yes
```

Sample result 2:
```
Input a year: 2017
Is 2017 a leap year? No
```

Same steps as in Q2, but use different condition.

Q4. Write a program **Triangle.cpp** that reads the three sides (double type) of a right-angled triangle. It then calculates and displays the sine, cosine and tangent of angle A as shown in the figure. The result is displayed in 3 columns with each column is 10-character wide, and all values are displayed in 3 decimal places. If the three sides cannot form a right-angled triangle, an error message is shown.

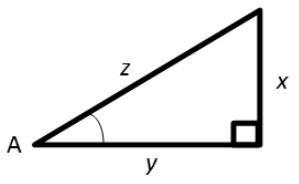
Hint: You need to include the header file <iomanip>.

Sample result 1:
```
Input side x: 3.3
Input side y: 4.4
Input side z: 5.5
      sinA       cosA       tanA
     0.600      0.800      0.750
```

For right-angled triangle:

$$x^2 + y^2 = z^2$$

$$\sin A = \frac{x}{z} \quad \cos A = \frac{y}{z} \quad \tan A = \frac{x}{y}$$



Sample result 2:
```
Input side x: 5
Input side y: 5
Input side z: 5
Error: Not right-angled triangle
```

Q5. Write a program **Interest.cpp** that reads a non-zero principal value and the customer type (0 to 4, an integer). It then calculates the simple interest payable after one year using the input values, based on the interest rates shown in the table below. **Use switch statement in your answer.**

Customer type	0	1	2	3	4
Interest rate per year	0.5%	0.8%	1%	1.2%	2%

Sample result 1:

```
What is the principal value? 15000
Please enter the customer type: 2
Interest payable after one year: $150
```

Sample result 2:

```
What is the principal value? 30000
Please enter the customer type: 3
Interest payable after one year: $360
```

Sample result 3:

```
What is the principal value? 15000
Please enter the customer type: 5
Interest payable after one year: Error in customer type
```

Q6. Write a program **CheckDate.cpp** that checks whether an input date is correct. Note that February has 29 days in a leap year (refer to Q3). You may assume that user inputs integer values only.

Hint: cin reads input value up to a space, or when enter is reached.

Sample result 1:

```
Input day month year: 22 11 2000
22-11-2000 is correct
```

Sample result 2:

```
Input day month year: 30 2 2000
30-2-2000 is incorrect
```