Objective:

- To get a grip on Conditional/Selection Structure.
- Issues related to keyboard input stream.

Selection Structure

Task-1:

The starting point for the selection structure in C++ is your practice file-2, Your previous quizzes/labs based on decision structure.

Task-2:

Write a program that can be used as a math tutor for a young student. The program should display two random numbers to be added, such as

```
   247
+ 129
---------
```

The program should then ask student/user to enter the answer. After getting answer from user, your program checks whether the answer is correct or not and display the message accordingly

Sample Run:

```
*****Kangaroo Math Competition*****
    247
+   129
--------
Hey Kido! Enter Your Answer: 312
OOPs Kido! Your answer is incorrect. Keep doing the hard word. You will crack it one day.
    247
+   129
--------
    376
```

Note: *Both random numbers will be greater than zero and maximum 5 digits. The input/output should be displayed just as shown in the sample run.*

Task-3:

A long-distance carrier charges the following rates for telephone calls:

Starting Time of Call	Rate per Minute
00:00–06:59	0.12
07:00–19:00	0.55
19:01–23:59	0.35

Write a program that asks for the starting time and the number of minutes of the call, and displays the charges. The program should ask for the time to be entered as a floating-point number in the form HH.MM. For example, 07:00 hours will be entered as 07.00, and 16:28 hours will be entered as 16.28.
Input Validation: The program should not accept a time value, which is greater than 23:59.
Also, no number whose last two digits are greater than 59 should be accepted.
Hint:
Assuming num is a floating-point variable, the following expression will give you its fractional part:

num - (int) num

Issues Related to Input

Task-1:
Suppose x and y are int variables and ch is a char variable. Consider the following input:
5 28 36
What value (if any) is assigned to x, y, and ch after each of the following statements executes? (Use the same input for each statement).

A.
```
cin >> x >> y >> ch;
```
B.
```
cin >> ch >> x >> y;
```
C.
```
cin >> x >> ch >> y;
```
D.
```
cin >> x >> y;
cin.get(ch);
```

Task-2:
Suppose x and y are int variables and z is a double variable. Assume the following input data:
37 86.56 32
What value (if any) is assigned to x, y, and z after each of the following statements executes? (Use the same input for each statement.)

A.
```
cin >> x >> y >> z;
```
B.
```
cin >> x >> z >> y;
```
C.
```
cin >> z >> x >> y;
```

Task-3:
Suppose x and y are int variables and ch is a char variable. Assume the following input data:
13 28 D
14 E 98
A B 56
What value (if any) is assigned to x, y, and ch after each of the following statements executes? (Use the same input for each statement.

A.
```
cin >> x >> y;
cin.ignore(50, '\n');
cin >> ch;
```
B.
```
cin >> x;
cin.ignore(50, '\n');
cin >> y;
cin.ignore(50, '\n');
cin.get(ch);
```
C.
```
cin >> y;
cin.ignore(50, '\n');
cin >> x >> ch;
```
D.
```
cin.get(ch);
cin.ignore(50, '\n');
cin >> x;
cin.ignore(50, 'E');
cin >> y;
```

Task-4:
Given the input:
46 A 49
and the C++ code:

```
int x = 10, y = 18;
char z = '*';
cin >> x >> y >> z;
cout << x << " " << y << " " << z << endl;
```
What is the output?

Task-5:
Suppose that age is an int variable and name is a C style string variable char name[50]. What are the values of age and name after the following input statements execute?

```
cin >> age;
cin.getline(name, 50);
```

If the input is:

A.
```
23 Lance Grant
```

OR the input is

B.
```
23
Lance Grant
```

Attempt the following after next lecture

Task-1:
Given three numbers a, b and c such that a, b and c can be at most 10^{16}. The task is to compute $(a * b)\%c$.

Task-2:
Write a program which inputs an integer representing the weekday (1, 2, …, 7), and display on console the day of week in English (Monday, Tuesday, …, Sunday).

Input Validation: If user enters value other than 1 to 7 then your program should display a message "Not a valid Week Day".

Note: *Do this Task using switch statement*

For Example:

- *If user enters 1 then your program display Monday.*
- *If user enters 3 then your program display Wednesday.*
- *If user enters -4 then your program display Not a Valid Week Day*.

Task-3:
Write a program that can be used as a math tutor for a young student. The program should display two random numbers to be added, or subtracted, divided or, multiplied. It is an extension to the Task-2 of this practice file. In which your program will randomly decide the type of operation (add/divided/multiply/subtract/Mod).
Note: In case of any operation, both the operands signs will be chosen randomly.

Example Inputs:

Example Input-1 + 47 + 129 ADD --------- ***Example Input-2*** + 47 - 129 SUB --------- ***Example Input-3*** - 47 + 129 Mod ---------	***Example Input-4*** - 47 - 129 DIV --------- ***Example Input-5*** - 47 - 129 SUB ---------

Note: The answer should be displayed as follows:

Example Input-1

```
-      46
-       2  DIV
---------
+      23
```

Task-4: ***ABRACADABRA***

In this task, our goal is to develop a program, which should be able to guess a number in user's mind. This program will ask the user to think of any number in the range of 1 ~ 1000.
Your program should be sharp / intelligent enough to guess the number in user's mind in not more than 10 unsuccessful attempts. At each attempt your program can ask the user the following queries:

Assume your program guess a number 'X', then the program will ask from user:

- Is the hidden number equal to 'X'.
- Is the hidden number less than 'X'.
- Is the hidden number greater than 'X'.

Task 5: ***Internet Service Provider, Part 1***

An Internet service provider has three different subscription packages for its customers:

Package A: For $9.95 per month 10 hours of access are provided. Additional hours are $2.00 per hour.
Package B: For $14.95 per month 20 hours of access are provided. Additional hours are $1.00 per hour.
Package C: For $19.95 per month unlimited access is provided.

Write a program that calculates a customer's monthly bill. It should ask which package the customer has purchased and how many hours were used. It should then display the total amount due.

Input Validation: Be sure the user only selects package A, B, or C. Also, the number of hours used in a month cannot exceed 744.

Task 6: ***Internet Service Provider, Part 2***

Modify the Program in Task-7 so that it also displays how much money Package A customers would save if they purchased packages B or C, and how much money Package B customers would save if they purchased Package C. If there would be no savings, no message should be printed.

Task 7: ***Internet Service Provider, Part 3***

Months with 30 days have 720 hours, and months with 31 days have 744 hours. February, with 28 days, has 672 hours. Enhance the input validation of the Internet Service Provider program by asking the user for the month (by name), and validating that the number of hours entered is not more than the maximum for the entire month.
Here is a table of the months, their days, and number of hours in each.

Month	Days	Hours
Jan	31	744
Feb	28	672
Mar	31	744
Apr	30	720
May	31	744
Jun	30	720
Jul	31	744
Aug	31	744
Sep	30	720
Oct	31	744
Nov	30	720
Dec	31	744