Department of Electrical and Computer Engineering
University of Massachusetts Dartmouth

ECE160: Foundations of Computer Engineering I (Spring 2023)
Instructor: Dr. Liudong Xing

LAB # 6
(Relevant Lecture: #12, #13)
Monday, February 27 (L1) and Wednesday, March 1 (L2)

OBJECTIVES
- o   To learn how to use the multi-way selection statement **switch**
- o   To learn how to program using **loops**

SUBMISSION REQUIREMENT
1. Please follow "Submission Guidelines" in the lab section of the course website to submit your solution (program files) to the class M: drive by 5pm, Wednesday, March 1.
2. Suggested format for naming your solution files: lab#-your last name-p#.cpp

   For example: lab6-xing-p1.cpp for problem 1; lab6-xing-p2.cpp for problem 2; …

EXERCISES

1. Write a program to do the following things **using a switch statement**
   1) input an income (integer type) from the keyboard, then
   2) calculate the tax (floating point type) on the income, which is income * tax rate. The tax rate is determined based on the following assumptions:
      a.   If income <1000, no tax (or tax rate is 0)
      b.   If 1000 <= income <2000, tax rate = 25%
      c.   If income >= 2000, tax rate = 30%
   3) finally display the tax for the income.
   Note that you have done this problem in Lab#4 using the two-way selection statements. Here it is required that you develop your program using the switch statement.
   Hint: define an integer variable as income/1000

   Example Runs to Test your Program:
   - Input income 737, the tax 0.000000 is displayed on the screen
   - Input income 1600, the tax 400.000000 is displayed on the screen
   - Input income 2000, the tax 600.000000 is displayed on the screen
   - Input income 2070, the tax 621.000000 is displayed on the screen

2. Write a program using the **switch** statement. The program can read an integer number from the keyboard, and output "Order breakfast" if the number is 1; output "Order lunch" if the number is 2; output "Order dinner" if the number is 3; and output "Order nothing" if the number is any other value.

1
2
3
7

3. Write a program that uses loop(s) to print a series of numbers on multiple lines as follows (Refer to the example on Slide 27 in Lecture #13):

                1 1 1 1 1 1
                2 2 2 2 2 2
                3 3 3 3 3 3
                4 4 4 4 4 4

4. Modify the program in Exercise 3 to print a series of numbers on multiple lines as follows:

                2 2 2 2 2 2
                4 4 4 4 4 4
                6 6 6 6 6 6
                8 8 8 8 8 8

5. To understand the use of break and continue statements in loops (Refer to Slides 29-34 in Lecture#13), run the following three programs and compare their results. If you have problems with understanding the results, please seek help from the lab assistants.

Program #5.1:

```
#include <stdio.h>
void main(void)
{
        int a;
        for (a =1; a <= 7; a++)
                    printf("%d\n", a);

}
```

Program #5.2:

```c
#include <stdio.h>
void main(void)
{
        int a;
        for (a =1; a <= 7; a++)
        {
                if(a == 6)
                        break;
                        printf("%d\n", a);
        }
}
```

Program #5.3:

```c
#include <stdio.h>
void main(void)
{
        int a;
        for (a =1; a <= 7; a++)
        {
                if (a == 6)
                        continue;
                printf("%d\n",a);
        }
}
```