Department of Electrical and Computer Engineering
University of Massachusetts Dartmouth

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

LAB #5
(Relevant Lecture: #2-#10)
Tuesday, February 21 (L1) and Wednesday, February 22 (L2)

SUBMISSION REQUIREMENT

1.   Please follow "Submission Guidelines" in the lab section of the course website to submit your program files to the class M: drive **by 5pm, Thursday, February 23**.

2.   Suggested format for naming your solution files: lab#-your last name-p#.cpp
        For example: lab5-xing-p1.cpp for problem 1; lab5-xing-p2.cpp for problem 2; …

EXERCISES

1. **Write down the output of each printf() in the following program first.** Then check your results by compiling and running this program. **Do think about and understand the answers!!**

```c
#include <stdio.h>
void main(void)
{
    int a = 7;
    int b = 3;
    int c = 2;
    float d = 4.0;
    float e = 0;
    int g = 0;

    printf("%d\n", b % a * c);

    e = (float)(a / b) + c / d;
    printf("%4.2f\n", e);

    e = (float)a / (b - 1) * 2 + d;
    printf("%f\n", e);

    printf("%d\n", a && b);

    printf("%d\n", !a || !b);

    b = ++a;
    printf("%d\n", b);

    printf("%d\n", a * c);

    g = --a * (2 + c) / 2 - c++ * b;
    printf("%d\n", g);
}
```

2. Correct errors in the following C program. Then run the program by input 3 and 6. The output should be

> The value of b is 6.000
> The value of a/b is 0.500000

```c
/* This is a debugging problem in Exam #1  /*
#include <stdio.h>;
void main(void);
{
    integer a=0
    float  b=0
    printf(Please input two numbers:\n);
    Scanf_s("%d%f", a, b);
    printf("The value of b is %5.3f\n", &b);
    printf("The value of a/b is %d %f\n", a/b).
}
```

3. Write a complete C program that can perform the following consecutive tasks:
   1) Read an integer number from the keyboard.
   2) Extract the last digit of the number. Note that you may use the modulo % operator to extract the last digit. For example, 19%10 = 9, 63%10 = 3.
   3) If the last digit of the number is less than 7, you multiply the number by 10; otherwise (i.e., the last digit is 7 or greater), you add 10 to the number.
   4) Print out the updated integer number.

   Example Runs to Test your Program:
   1) Input 19 from the keyboard, 29 should be displayed on the screen
   2) Input 63 from the keyboard, 630 should be displayed on the screen

4. Write a complete C program that can perform the following consecutive tasks:
   1) Read 2 integer numbers from the keyboard
   2) Add the two numbers
   3) If the sum of the two numbers is an even number, "The sum is an even number" is output. If the sum of the two numbers is an odd number, "The sum is an odd number" is output.

   Example Runs to Test your Program:
   1) Input 7 and 10 from the keyboard, "The sum is an odd number" is displayed
   2) Input 23 and 19 from the keyboard, "The sum is an even number" is displayed