Lab instructions

Week 03

Introduction to Programming
ECS 102, 2018-19 Semester II

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even_odd.c

```
#include <stdio.h>
void main()
{
        int x;
        scanf("%d",&x);                 // scanning from the command line
        printf("x/2: %d\n", x/2);  // decimal part truncated

        if ((x/2)*2 == x)
                printf("x: %d is even", x);
        else
                printf("x: %d is odd", x);
}
```

You can also check with other ways e.g. using remainder of division x%2 == 0

qudratic_2.c

Write a program to compute the **real** roots of a quadratic equation

$$ax^2 + bx + c = 0.$$

The program should ask for the values of a, b, and c, and print the roots. Use the following rules.

(a) No solution, if both a and b are zero.

(b) There is only one root if $a = 0$.

(c) There are no real root is $\mathrm{b}^2 - 4ac$ is negative.

(d) Otherwise, there are two real roots.

Test your program with appropriate data so that all logical paths are working as per your design. Incorporate appropriate output messages.

math_loop.c

```
#include <stdio.h>
#include <math.h>
#define   PI        3.1416
#define   MAX       180

void main()
{
        int angle = 0;
        printf("angle  sin(angle)\n");
        while(angle <= MAX)
        {
                printf("%5d %7.4f\n", angle, sin((PI/MAX)*angle));
                angle = angle + 10;
        }
}
```

Use of “while” loop

interest_rate_loop.c

Write a program to print the amount in the end of each year for a PERIOD of 10 years, given

(a) Initial AMOUNT 1000.00.

(b) Interest rate 12%.

Use a while loop to calculate the amount and print

perfect_square.c

Write a program to check whether a given number is a perfect square and if yes, print the answer ans.

$$ans^2 = x$$

The program should ask for the value of x, and follow the rules below.

(a) If $x \leq 0$, print that x is not a positive number.

(b) Print if x is not a perfect square.

(c) Otherwise, print ans.

Test your program with appropriate data so that all logical paths are working as per your design. Incorporate appropriate output messages.

Do NOT use **sqrt** or any math library function.

square_root.c

Write an iterative program using while loop to calculate the square root of a given number x. You should start with a guess g and iterate with the following replacement of g

$$g \to (g + x/g)/2$$

until the absolute value of

$$g * g - x \geq 0.0001.$$

You can use **fabsf** function in math library to get the absolute value.

The program should ask for the value of x, and if $x \leq 0$, print that x is not a positive number.