# CMPE 108 - Experiment 3 Selective Structures

## **OBJECTIVES:**

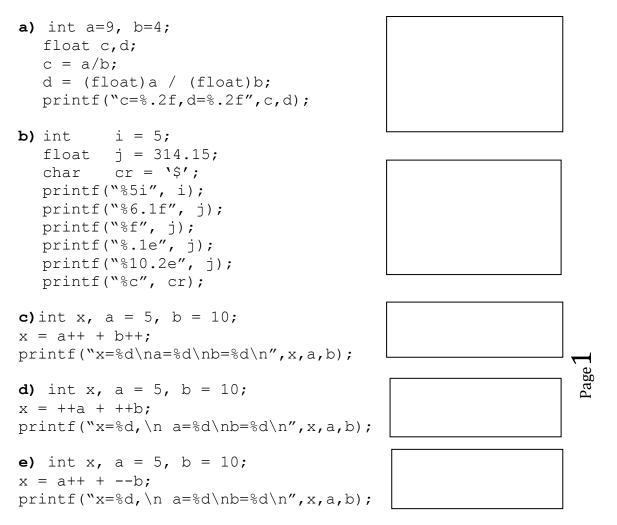
- Understand how to edit, compile and execute C computer codes.
- Understand C programming: sequential and selective structures

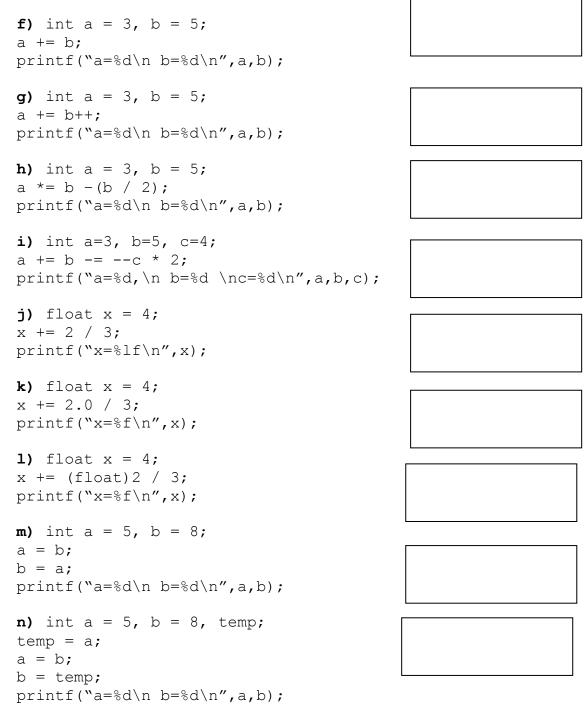
### **NOTES:**

- You should prepare the preliminary work before coming to the laboratory session and bring soft or hard copies of the preliminary work with you.
- Before writing a computer code, you should do the following steps: 1) understand and analyze the problem,
  - 2) develop an algorithm and/or flowchart,
  - 3) convert the algorithm and/or the flowchart into a C code.

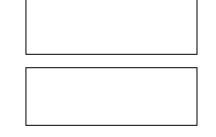
# **PRELIMINARY WORK:**

#### 1. What is the output of the following C code fragments?



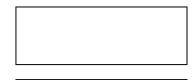


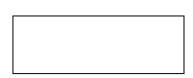
- 2. What is the out of the following C code fragments for the following declarations? float x; int i,j,k;.
- a) i=5; j=2; if(i=50||j==2) printf("%d",i-j);
- b) i=5; j=2; if(i==50||j==2) printf("%d",i-j);



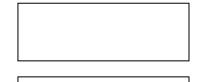
- c) i=1;j=1;k=1; k+=-i++ + ++j; printf(``%d %d %d\n", i,j,k);
- d) i=1;j=2;x=3.0; x/=j=++i\*2.5; printf("%f %d %d\n",x,i,j);
- e) i=1;j=2;x=3.0; x/=j=i++\*2.5; printf("%f %d %d\n",x,i,j);

- j) j=9;k=2; i=j%k?++j:++k; printf("j = %d k = %d\n", j, k);



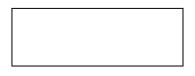


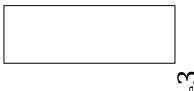


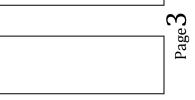


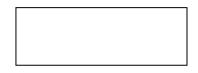












**3.** Write separate C programs to evaluate the given program fragments and write the produced outputs in the corresponding boxes. Use the following declarations:

```
int a, b, c, sum;
a=3, b=5, c=4, sum=0;
```

a)

```
if (b%a)
{
    if (a>b)
        printf("a is greater");
    else
        printf("b is greater");
}
```



b)

```
if (b%a)
(a>b) ? printf ("greater a") : printf("greater b");
```

c)

```
(a>b)?sum=a+b:(a<c)?sum=a+c:sum=a+b+c;
printf("sum is %d\n", sum);
```

d)

```
if (a>b)
{
    sum= a+b;
    printf("sum is %d\n", sum);
}
else if (a<c)
{
    sum= a+c;
    printf("sum is %d\n", sum);
}
else
{
    sum= a+b+c;
    printf("sum is %d\n", sum);
}</pre>
```

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4. Rewrite the following using if-else-if structure.

```
switch(i){
case 0: k+=i;break;
case 1: k*=i;break;
case 2: case 3: k/=i;break;
default: k%=i;
}
```

#### **TASKS during the LAB hours:**

**1.** Write an *if* statement that computes and prints the circumference or the area of a square using the formulas:

circumference = 4\* side area = side \* side

Enter the value of integer variable side from the keyboard. Assume that if user\_request is 1, the program finds the circumference and prints and if it is 2, the program finds the area and prints.

2. Write a program for the following problem. An instructor needs a program that accepts student identification number std\_id and three exam grades, exam1, exam2 and final\_exam for a course, as input and then determines and outputs for the student, the semester average and the final letter grade of the course according to the following table:

Semester Average	Letter Grade
90-100	А
80-89	В
70-79	С
60-69	D
0-59	F

The semester average for the student is computed using the following formula:

semester\_average = 0.20 \* exam1 + 0.30 \* exam2 + 0.50 \* final\_exam

Student identification numbers are integers but not 0 or negative numbers. The program should print an appropriate message when 0 or negative number is entered for the student identification.

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A session of the program should have the following appearance:

```
Enter student id_no: 1100
Enter exam grade 1: 70
Enter exam grade 2: 80
Enter final exam grade: 100
Semester average for student 1100: 88
Letter grade for student 1100 : B
```

If 0 or negative number is entered for student identification:

Enter student id\_no: 0 Student id no is wrong.

Consider the following quadratic equation:
 A\*X<sup>2</sup> + B\*X + C

Then, the roots of this equation can be obtained as X1 = (-B + SQRT(Disc))/(2\*A)

```
X2 = (-B - SQRT(Disc)) / (2*A)
where the discriminator (Disc) is given by
Disc = B<sup>2</sup> - 4*A*C
```

- **a**) Write a C program that will read the value of the inputs A, B, and C, and then check for the following conditions and do the corresponding tasks:
  - If Disc > 0, then find the roots X1 and X2 and then display the result as, The roots are different: X1=....... X2=.......

  - If Disc <0, then display the following message: The roots are imaginary.
- **b**) Re-write the same code by using switch statement rather than if/else.