CSE115L – Programming Language I Lab
Lab-03
Arithmetic & Bitwise Operators

In this lab, we will learn about the Arithmetic & Bitwise operators. The following example will help you remember the syntax.

Example 1: Using the arithmetic operators.

```
#include <stdio.h>
int main()
{
    int a = 9, b = 4, c;
    float x = 25.0, y = 2.0;
    c = a+b;
    printf("a+b = %d \n",c);
    c = a-b;
    printf("a-b = %d \n",c);
    c = a*b;
    printf("a*b = %d \n",c);
    c=a/b;
    printf("a/b = %d \n",c);
    c=a%b;
    printf("a%%b = %d \n",c);
    printf ("(6 + a) / 5 * b = %d\n", (6 + a) / 5 * b);
    printf ("a / b * b = %d\n", a / b * b);
    printf ("x / y * y = %f\n", x / y * y);
    printf ("-a = %i\n", -a);
    printf("++a = %d \n", ++a);
    printf("b++ = %d \n", b++);
    printf("--a = %d \n", --a);
    printf("b-- = %d \n", b--);
    return 0;
}
```

Example 2: Using the bitwise operators.

```
#include <stdio.h>
int main()
{
    int a = 12, b = -125;
    printf("a&b = %d\n", a&b);
    printf("a|b = %d\n", a|b);
    printf("a^b = %d\n", a^b);
    printf("~a = %d, ~b = %d\n", ~a,~b);
    printf("a<<3 = %d\n", a<<3);
    printf("b<<3 = %d\n", b<<3);
    printf("a>>2 = %d\n", a>>2);
    printf("b>>2 = %d\n", b>>2);
    printf("b<<a = %d\n", b<<a);
    return 0;
}
```

Example 3: Write a program that reads two integers ***a*** and ***n***, and toggles (flips) the n^{th} bit of ***a***.

```
#include <stdio.h>
int main()
{
    int a, n;
    printf("Enter an integer: ");
    scanf("%d", &a);
    printf("Enter bit to toggle (0 to 31): ");
    scanf("%d", &n);
    a = a ^ (1 << n);
    printf("Result = %d\n", a);
    return 0;
}
```

Perform the following tasks.

Task 1: Write a program that reads a temperature (in degree Celsius) from the user and prints the temperature in degree Fahrenheit. For conversion, use the formula, $F = C \times (9 / 5) + 32$.

Sample Input:	Sample Output:
Enter a temperature: 47	116.60 degree Fahrenheit

Task 2: Write a program that reads in 3 integer numbers and prints their average.

Sample Input:	Sample Output:
Insert first number: 3 Insert second number: 8 Insert third number: 2	The average is: 4.3

Task 3: Write a program to read an integer amount and break the amount into smallest possible number of bank notes.

Sample Input:	Sample Output:
Input the amount: 375	There are: 3 note(s) of 100.00 1 note(s) of 50.00 1 note(s) of 20.00 0 note(s) of 10.00 1 note(s) of 5.00 0 note(s) of 2.00 0 note(s) of 1.00

Task 4: Write a program that reads three integers *a*, *x*, and *y*, and calculates $2^x a/2^y$ without using any arithmetic operator.

Sample Input:	Sample Output:
Enter a: 124 Enter x: 10 Enter y: 3	Result: 15872