

## LAB 4 Evaluation Programs:

1. Develop a C program to find all possible roots of a quadratic equation.

```
#include <math.h>
#include <stdio.h>
int main() {
    double a, b, c, discriminant, root1, root2, realPart, imagPart;
    printf("Enter coefficients a, b and c: ");
    scanf("%lf %lf %lf", &a, &b, &c);
    discriminant = b * b - 4 * a * c;
    if (discriminant > 0) {
        root1 = (-b + sqrt(discriminant)) / (2 * a);
        root2 = (-b - sqrt(discriminant)) / (2 * a);
        printf("root1 = %.2lf and root2 = %.2lf", root1, root2);
    }
    else if (discriminant == 0) {
        root1 = root2 = -b / (2 * a);
        printf("root1 = root2 = %.2lf;", root1);
    }
    else {
        realPart = -b / (2 * a);
        imagPart = sqrt(-discriminant) / (2 * a);
        printf("root1 = %.2lf+%.2lfi and root2 = %.2lf-%.2fi", realPart, imagPart, realPart, imagPart);
    }

    return 0;
}
```

Case 1: Output for **real and equal**

```
Enter coefficients a, b and c: 2 4 2
root1 = root2 = -1.00;
```

Case 2: Output for **real and unequal**

```
Enter coefficients a, b and c: 2 -8 2
root1 = 3.73 and root2 = 0.27
```

Case 3: Output for **real and imaginary**

```
Enter coefficients a, b and c: 2.3 4 5.6
root1 = -0.87+1.30i and root2 = -0.87-1.30i
```

2. Illustrate conditional branching statements to find the smallest of three numbers.

```
#include<stdio.h>
int main()
{
    int num1,num2,num3;
```

```
printf("Enter three numbers:");
scanf("%d %d %d",&num1,&num2,&num3);
if(num1 < num2 && num1 < num3)
{
    printf("%d is smallest",num1);
}
else if(num2 < num3)
{
    printf("%d is smallest",num2);
}
else
{
    printf("%d is smallest",num3);
}
return 0;
}
```

Case 1: **First number** is smallest

```
Enter three numbers:10 11 12
10 is smallest
```

Case 2: **Middle number** is smallest

```
Enter three numbers:22 20 26
20 is smallest
```

Case 3: **Last number** is smallest

```
Enter three numbers:42 44 22
22 is smallest
```