PROGRAMMING IN C

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BE Software

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Programming in C

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Practical No: 2

Title: TO LEARN THE CONDITIONAL STATEMENTS

Objective:

1. Understanding the conditional statements.
2. Understanding proper use and utilization of if, if-else, nested if-else.
3. Using conditional statements to solve conditional problems

Theory:

- Conditional Statements/Decision Control Instructions: Conditional Statements are used to make decisions based on the conditions. They execute sequentially when there is no condition around the statements. i.e. if, if-else, nested if-else, nested else-if
- if statement: If statement is the most basic conditional statement. It is always used with a condition and evaluates statements to either true or false. It is used as
    - If (condition is true)
      execute this statement;
- if-else statement: The if statement does nothing when the condition is false. In such case, the if-else statement is used. It is used as
    - If (condition is true)
      execute this statement;
      else
      execute this statement;
- Nested if-else: If multiple conditions are required then nested if-else is used. So using if-else construct within if/or statement is called nesting. It is used as
    - If (condition is true)
      execute this statement;
      else

[if(condition is true)
execute this statement
else

Example:

```
#include<stdio.h>
int main() {
int a;
printf("Enter a number");
scanf("%d",&a);
if (a==0)
        printf("You just typed the number 0");
else
{ if (a > 0)
         printf("You just typed a number greater than 0");
else
        printf("You just typed a number less than 0");
}
printf("
return 0;
}
```

(Here nested if else is used to state w condition whether the number is 0, less than 0 or greater than it)

OUTPUT

Enter a number: -1

You just typed a number less than 0

Practical:

1) **What will be the value of A and B on each line? A=10, B= 5; A=++A + ++A; B=A-- - --B; Also explain the operations**.

Algorithm:

Step 1: Start

Step 2: Declare variable A, B

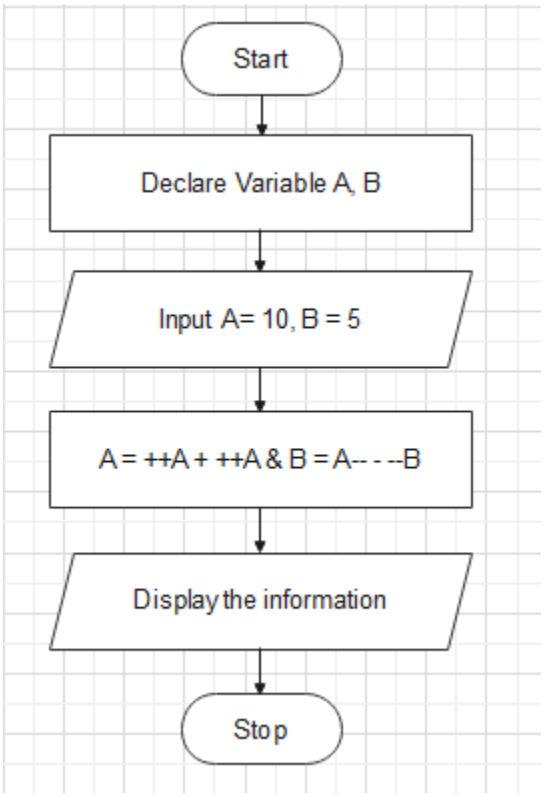
Step 3: Input A = 10, B = 5

Step 4: Perform A = ++A + ++A & B = A-- - --B

Step 5: Display the information

Step 6: Stop

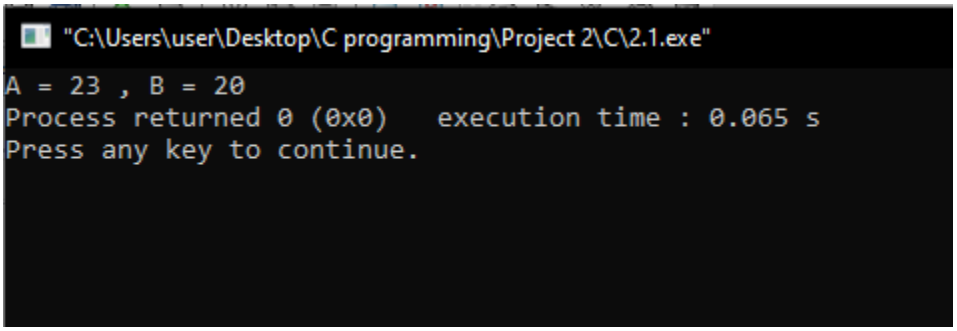
Flowchart:



Program:

```c
//Drishya Neupane 201648

//Question No 1

#include<stdio.h>
int main(){
    int A=10, B= 5;
    A=++A + ++A;
    B=A-- - --B;
    printf("A = %d , B = %d",A,B);
return 0;
}
```

Output:



Here, the final value of A is displayed as 23 and B is displayed as 20

We know A++ will increment the value of A and return it to A

Where ++A will increment the value of A and replace its new value

i.e ++A = 11 (New value of A= 11) & A++ = 11+1 = 12

Then, A = 12 + 11 = 23

Similarly for B, the value becomes 24 by following the rule of increment for A

Then, for B, A = 13 + 12 = 25 (i.e. new value of A = 12)

So, A-- = 24 & --B = 4

i.e A-- - --B = 24 – 4 = 20

2) Write a program to find out whether the entered number is odd or even using conditional operator.

Algorithm:

Step 1: Start

Step 2: Declare variable X

Step 3: Display "Input a number"

Step 4: Enter the number

Step 5: Check if X\2 = 0

Step 5.1: If Step 5 is true

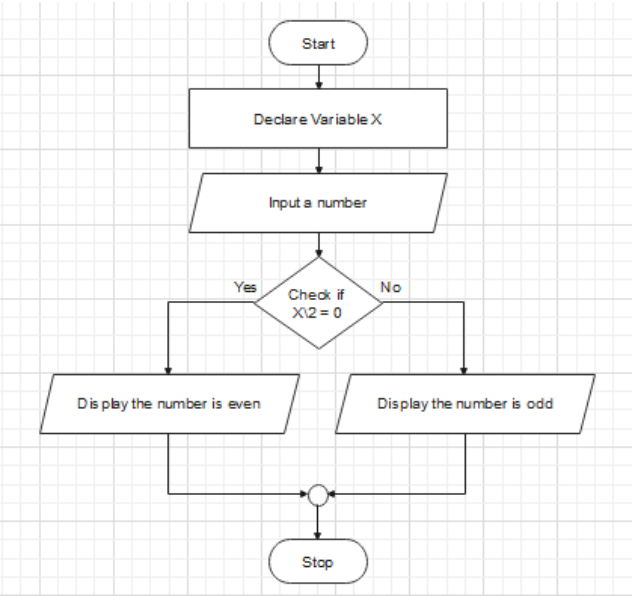
Step 5.2: Display the number is even

Step 5.1: If Step 5 is false

Step 5.2: Display the number is odd

Step 6: Stop

Flowchart:



Program:

```c
//Drishya Neupane 201648

//Question No 2

#include<stdio.h>
int main(){
    int X;
    printf("Input a number: ");
    scanf("%d",&X);

    if (X%2 == 0)
    //Here a modulus is taken with remainder 0 to find number exactly divisible by 2 i.e even
        printf("The number is even");
    else
        printf("The number is odd");
    return 0;
}
```

Output:

```
Input a number: 987
The number is odd
Process returned 0 (0x0)   execution time : 2.134 s
Press any key to continue.
```

```
Input a number: 986
The number is even
Process returned 0 (0x0)   execution time : 1.861 s
Press any key to continue.
```

3) Write a program to read the value of two variables, compute sum, difference and product

Algorithm:

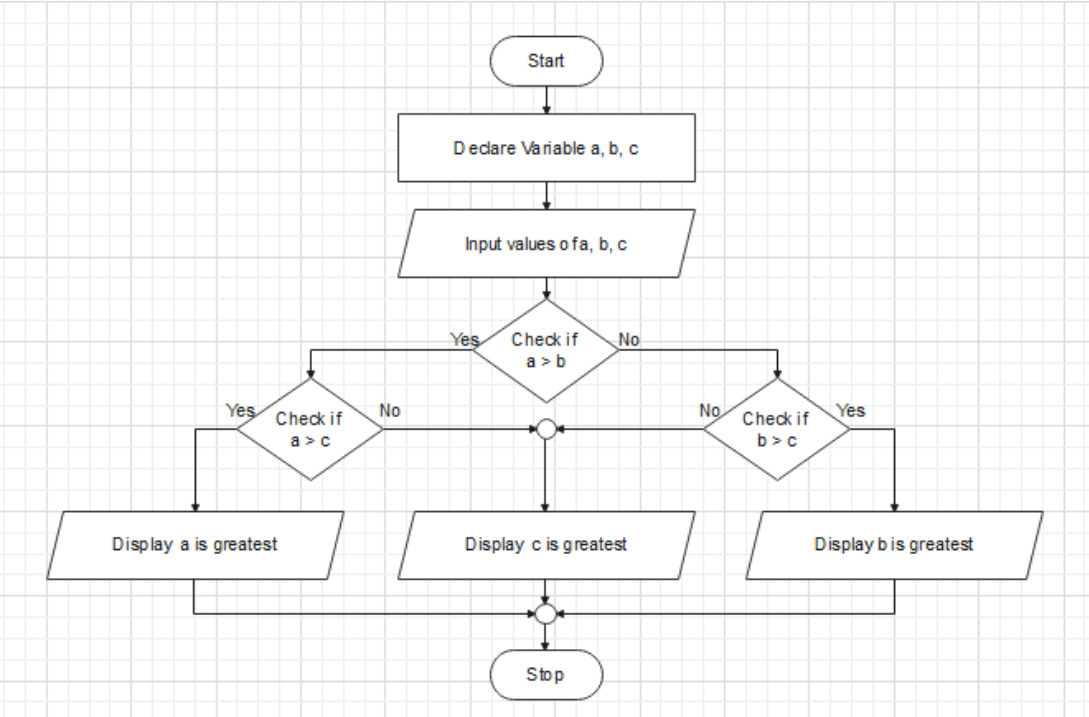
Step 1: Start
Step 2: Declare variable a,b,c
Step 3: Display "Input the value of a, b, c"
Step 4: Input the values of a, b, c
Step 5: Check a > b
    Step 5.1: If Step 5 is true
        Step 5.1.1: Check if a > c
            Step 5.1.1.1: If Step 5.1.1 is true
                Step 5.1.1.1.1: Display a is greatest

            Step 5.1.1.2: If Step 5.1.1 is false
                Step 5.1.1.2.1: Display c is greatest

    Step 5.2: If Step 5 is false
        Step 5.2.1: Check if b > c
            Step 5.1.1.1: If Step 5.1.1 is true
                Step 5.1.1.1.1: Display b is greatest

                Step 5.1.1.2: If Step 5.1.1 is false
                    Step 5.1.1.2.1: Display c is greatest
Step 6: Stop

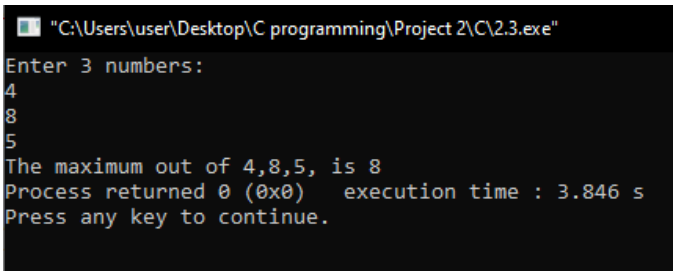
Flowchart:



Program:

```c
//Drishya Neupane 201648

//Question No 3

#include<stdio.h>
#include<conio.h>

int main(){
    int a,b,c,Maximum;
    printf("Enter 3 numbers:\n");
    scanf("%d%d%d",&a,&b,&c);
//Conditional operator is embeded
    Maximum = (a>b)?((a>c)?a:c):((b>c)?b:c);
/*This expression can be read as if a is greater than b, then is a greater than c? if it is
a is maximum and if not c is maximum. But if b is greater than a, is b greater than c? if it is
b is greater and if nor c is greater*/
    printf("The maximum out of %d,%d,%d, is %d",a,b,c,Maximum);
    return 0;
}
```

Output:



4) Write a program to find out the real and equal roots of a quadratic equation using conditional operator.

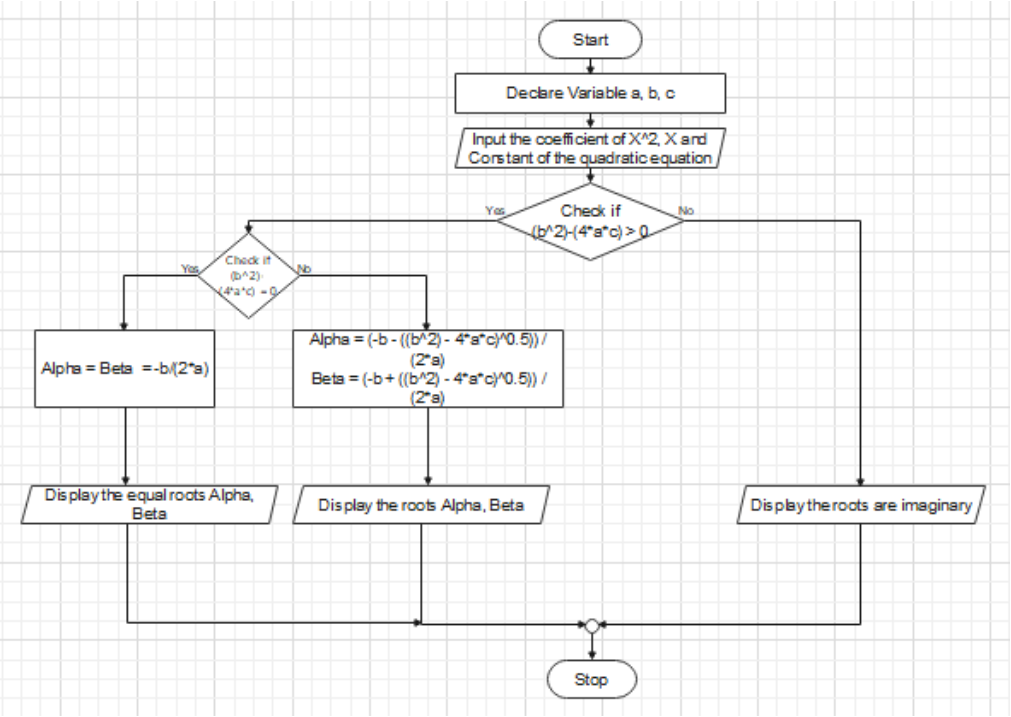
Algorithm:

Step 1: Start
Step 2: Declare variable a, b, c
Step 3: Display "Input the coefficient of x^2, x and constant of the quadratic equation"
Step 4: Input coefficient of x^2, x and constant (i.e. a, b, c)
Step 5: Check if (b^2)-(4*a*c)>0
    Step 5.1: If Step 5 is true
        Step 5.1.1: Check if (b^2)-(4*a*c) ==0
            Step 5.1.1.1: If Step 5.1.1 is true
                Step 5.1.1.1.1: The roots are equal, Alpha=Beta=-b/(2*a)
                Step 5.1.1.1.2: Display Alpha, Beta

            Step 5.1.1.2: If Step 5.1.1 is false
                Step 5.1.1.2.1: Alpha = (-b - ((b^2) - 4*a*c)^0.5)) / (2*a)
                Beta = (-b + ((b^2) - 4*a*c)^0.5)) / (2*a)
                Step 5.1.1.2.2: Display Alpha, Beta

    Step 5.2: If Step 5 is false
        Step 5.2.1: Display the roots are imaginary
Step 6: Stop

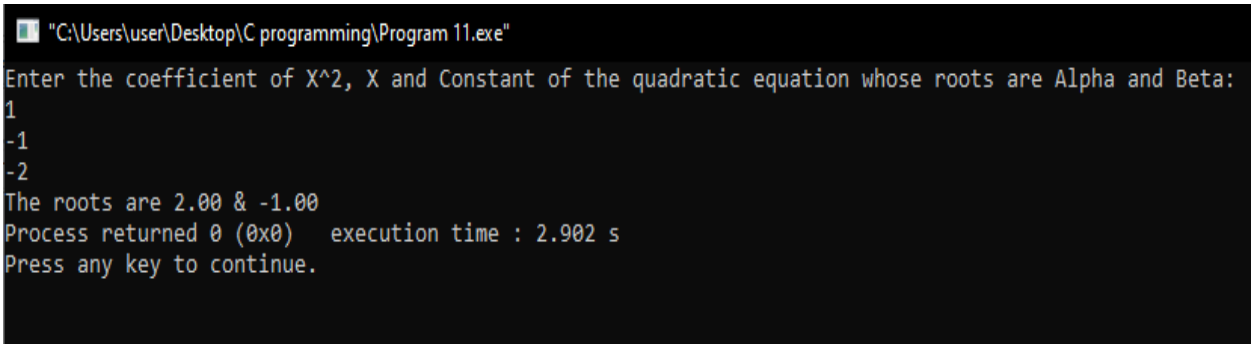
Flowchart:

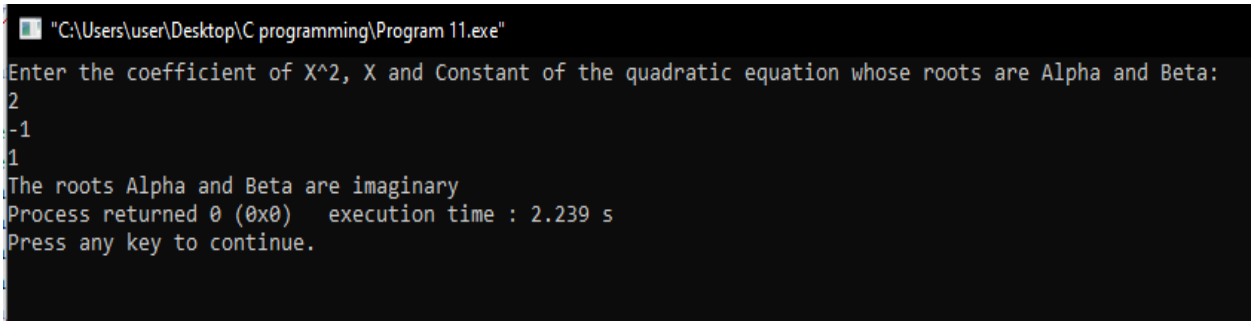


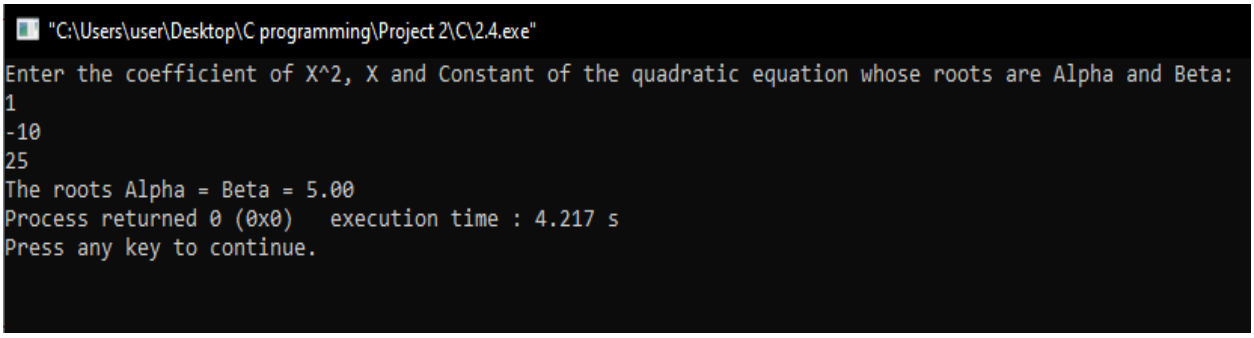
Program:

```
//Drishya Neupane 201648

//Program No.11

#include<stdio.h>
#include<math.h>
int main(){
    float a, b, c, value, alpha, beta;
    printf("Enter the coefficient of X^2, X and Constant of the quadratic equation whose roots are Alpha and Beta:\n");
    scanf("%f%f%f",&a,&b,&c);
//B^2-4ac is used to check whether the roots are real imaginary or equal
    value = (pow(b,2) - (4*a*c));
//if.....else if condition is used to check different conditions
if(value > 0)//The roots are real
{
    alpha = (-b + sqrt(value))/(2*a);
    beta =  (-b - sqrt(value))/(2*a);
    printf("The roots are %.2f & %.2f",alpha,beta);
}
else if (value==0)//The roots are equal
{
    alpha = beta = -b / (2 * a);
    printf("The roots Alpha = Beta = %.2f",alpha);
}
else //If none conditions are satisfied,the roor is imaginary
{
    printf("The roots Alpha and Beta are imaginary");
}
return 0;
}
```

Output:


"C:\Users\user\Desktop\C programming\Program 11.exe"
Enter the coefficient of X^2, X and Constant of the quadratic equation whose roots are Alpha and Beta:
1
-1
-2
The roots are 2.00 & -1.00
Process returned 0 (0x0)   execution time : 2.902 s
Press any key to continue.


"C:\Users\user\Desktop\C programming\Program 11.exe"
Enter the coefficient of X^2, X and Constant of the quadratic equation whose roots are Alpha and Beta:
2
-1
1
The roots Alpha and Beta are imaginary
Process returned 0 (0x0)   execution time : 2.239 s
Press any key to continue.


"C:\Users\user\Desktop\C programming\Project 2\C\2.4.exe"
Enter the coefficient of X^2, X and Constant of the quadratic equation whose roots are Alpha and Beta:
1
-10
25
The roots Alpha = Beta = 5.00
Process returned 0 (0x0)   execution time : 4.217 s
Press any key to continue.

5) .**Write a program to illustrate the modulus operator in which second is given as an input and the program converts it to hours, minutes and seconds**.

Algorithm:

Step 1: Start

Step 2: Declare variable x,hour,minute,second

Step 3: Display "Input the time period to be converted"

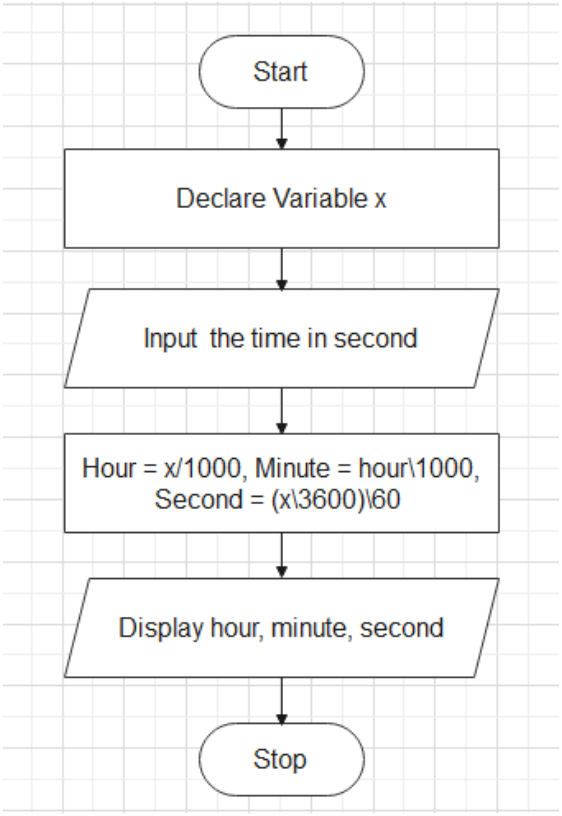
Step 4: Input the time in second

Step 5: hour = x/1000, minute = hour%1000, second = (x%3600)%60

Step 6: Display hour, minute, second

Step 7: Stop

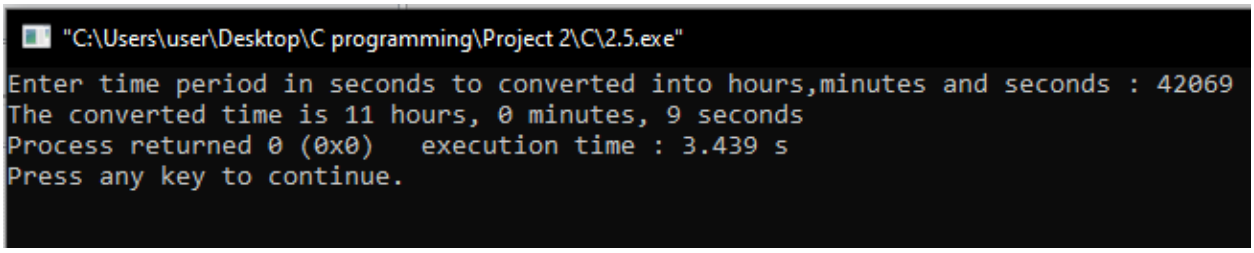
Flowchart:



Program:

```c
//Drishya Neupane 201648

//Question no 5

#include<stdio.h>
int main(){
    int x,hour,minute,second;
//Here the variables are taken in int so that modulus work properly
    printf("Enter time period in seconds to converted into hours,minutes and seconds : ");
    scanf("%d",&x);
    hour = x/3600;
//Here dividing the second by 3600 gives exact hour as it is taken as int
    minute = hour/60;
//Similarly,doing the same gives exact mminute
    second = (x%3600)%60;
//As we're performing operations in seconds, modulus is used in the value provided.
//First modulus gives the remainder value in minute, the other converts it to second
    printf("The converted time is %d hours, %d minutes, %d seconds",hour,minute,second);
    return 0;
}
```

Output:



6) Write a program that asks for your height in feet and inches and your weight in kilograms (use three variables to store the information). Convert your height in feet and inches to your height in inches. Then convert your height in inches to height in meter by multiplying it by 0.0254. Now divide your weight by square of your height in meter and finally assign the output to variable ratio. Also display all the information.

Algorithm:

Step 1: Start

Step 2: Declare variable weight, height1, height2

Step 3: Display "Enter your height in feet and inches and your weight in kilogram"

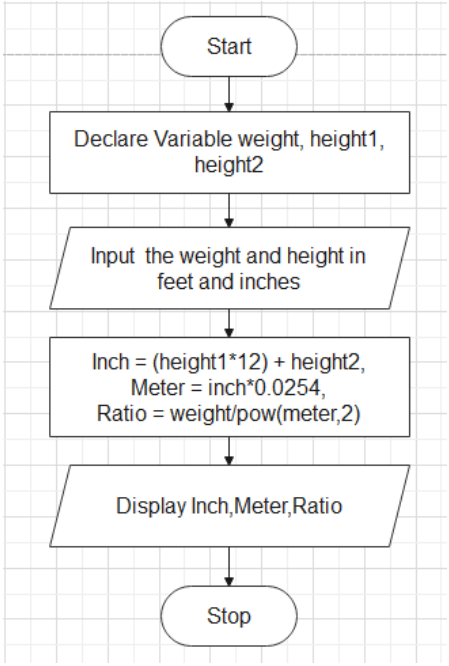
Step 4: Enter your height in feet (as height1) and inches as (height 2) and your weight in kilogram

Step 5: inch = (height1*12) + height2, meter = inch*0.0254, ratio = weight/pow(meter,2)

Step 6: Display inch, meter & ratio

Step 7: Stop

Flowchart:



Program:

```c
//Drishya Neupane 201648

//Question no 5

#include<stdio.h>
#include<math.h>
int main(){
    float weight,meter,ratio;
    int feet,inch,height1,height2;
    printf("Enter your height in feet and inches\n i.e 5 feet 4 inch = 5 4\n");
    scanf("%d%d",&height1,&height2);
    printf("Enter your weight in kilogram : ");
    scanf("%f",&weight);
    inch = (height1*12) + height2;
    printf("Your height in inch is %dinch",inch);
    meter = inch*0.0254;
    printf("\n& Your height meter is %.2fmeter",meter);
    ratio = weight/pow(meter,2);
    printf("\nThe BMI is %.2f",ratio);
    return 0;
}
```

Output: