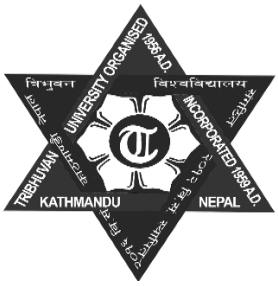
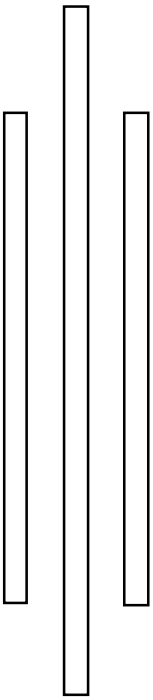
TRIBHUVAN UNIVERSITY



INSTITUTE OF ENGINEERING

Lab Sheet #4



PURWANCHAL CAMPUS

DHARAN-8

Submitted by:

Name: **Arbind Kumar Mehta**

Roll No: **PUR075BCT017**

Faculty: BCT

Group: I/I 'A'

Date: .....

Submitted to:

Department of

Electronics & Computer

Engineering

Checked by: .....

Title:

Write a program to input marks of 5 subjects (Physics, Chemistry, Math, English& Biology) for a student. Display the rank of each subjects and also the result of total marks and percentage obtained with his/her rank in the class. The rank is categorized as fail (marks < 40%), pass & third division (marks between 40 to 55%), second (marks between 55 to 65%), first (marks between 65 to 80%), Distinction (marks between 80 to 95%), extra ordinary (marks above 95 to 100%).

Objective:

- To understand the programming knowledge using Decision Statements (if, if-else, ifelse if ladder, switch and GOTO).

Problem Analysis:

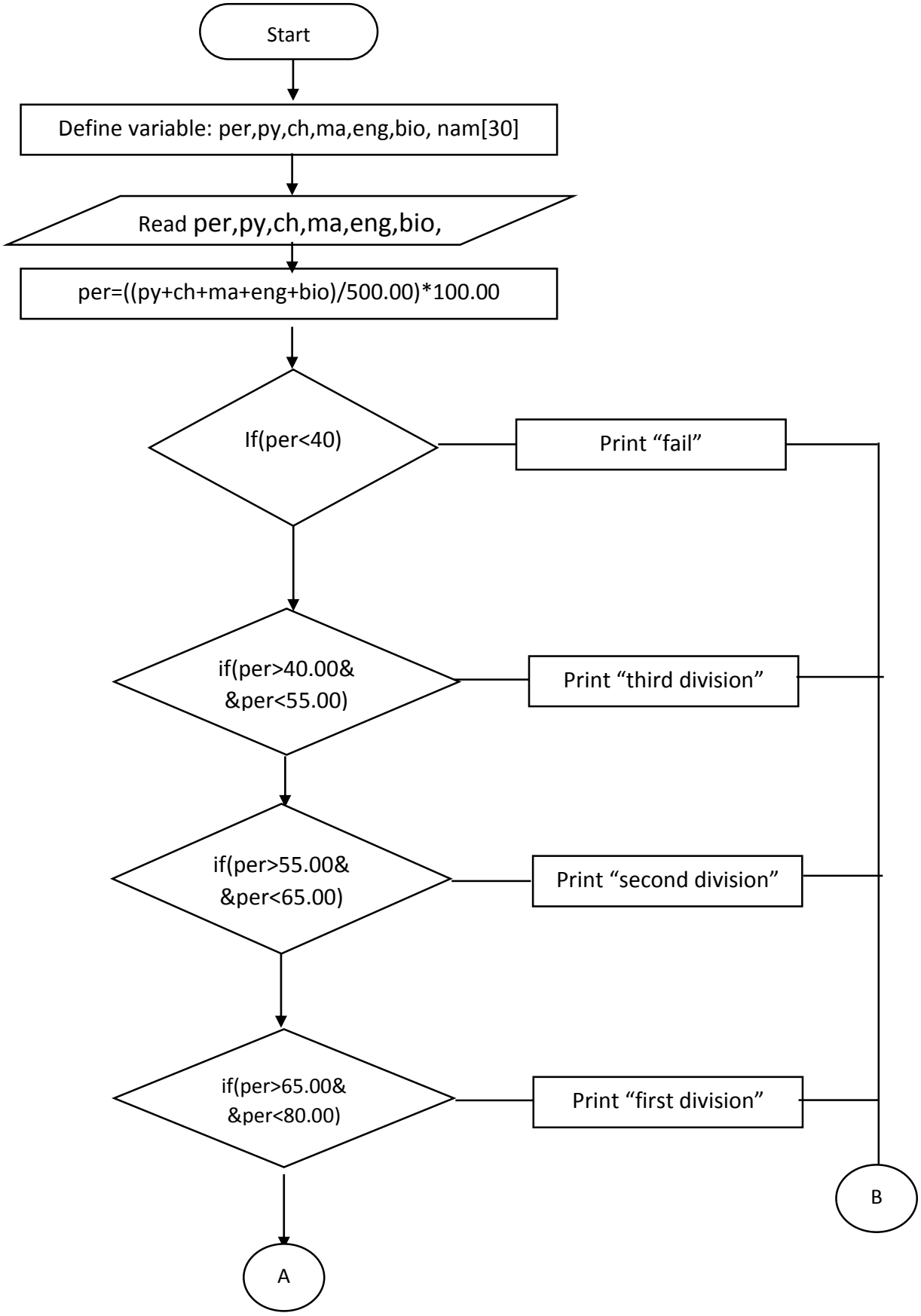
Based on problem, it is required to get the input of one char, one int and six float variables x and y. Different mathamatical operation should be performed by using formatted and unformatted I/O.

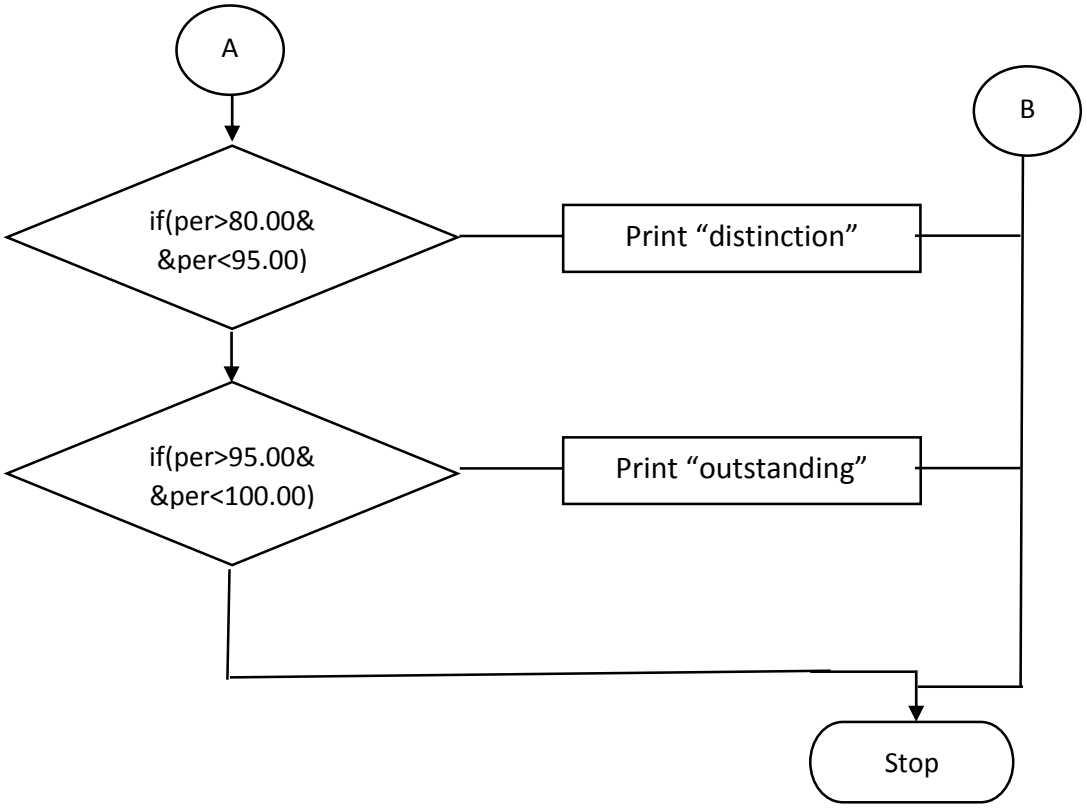
Input variables	**Necessary header files/functions/macros**
per,py,ch,ma,eng,bio (float type) nam[30](char type)	stdio.h coino.h scanf() printf() gets() getch()

Algorithm:

1. Start
2. Define variables: per,py,ch,ma,eng,bio, nam[30]
3. Take input from keyboard for all the input variables
4. per=((py+ch+ma+eng+bio)/500.00)*100.00
5. Print: fail (if per < 40%), pass & third division (if per between 40 to 55%), second (if per between 55 to 65%), first (if per between 65 to 80%), Distinction (if per between 80 to 95%), extra ordinary (if per above 95 to 100%).
6. Stop

Flowchart:


Start
Define variable: per,py,ch,ma,eng,bio, nam[30]
Read per,py,ch,ma,eng,bio,
per=((py+ch+ma+eng+bio)/500.00)*100.00
If(per<40)
Print “fail”
if(per>40.00&
&per<55.00)
Print “third division”
if(per>55.00&
&per<65.00)
Print “second division”
if(per>65.00&
&per<80.00)
Print “first division”
B
A

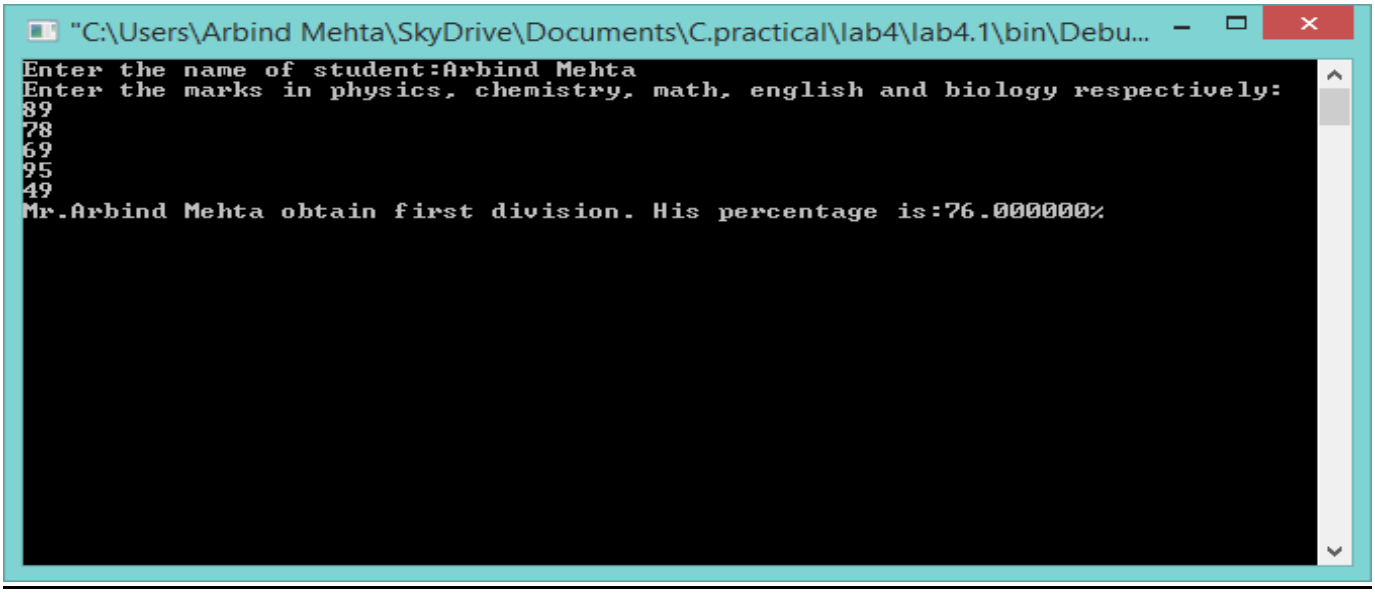


Code:

```
#include <stdio.h>
#include <stdlib.h>

int main()
{
   char nam[30];
   int rank;
   float per,py,ch,ma,eng,bio;

   printf("Enter the name of student:");
   gets(nam);
   printf("Enter the marks in physics, chemistry, math, english and biology respectively:\n");
   scanf("%f%f%f%f%f",&py,&ch,&ma,&eng,&bio);
```

```
    per=((py+ch+ma+eng+bio)/500.00)*100.00;


    if(per<40.00)
    printf("Mr.%s is fialed. His percentage is:%f%%\n",nam,per);
    if(per>40.00&&per<55.00)
    printf("Mr.%s obtain third division. His percentage is:%f%%\n",nam,per);
    if(per>55.00&&per<65.00)
    printf("Mr.%s obtain second division. His percentage is:%f%%\n",nam,per);
    if(per>65.00&&per<80.00)
    printf("Mr.%s obtain first division. His percentage is:%f%%\n",nam,per);
    if(per>80.00&&per<95.00)
    printf("Mr.%s obtain Distinction. His percentage is:%f%%\n",nam,per);
    if(per>95.00&&per<100.00)
    printf("Mr.%s obtain extraordinary rank. His percentage is:%f%%\n",nam,per);
    getch();
    return 0;
}
```

Output (Compilation, Debugging and Testing):



Discussion & Conclusion:

In this lab of C programming, based on the focused objective(s) to understand about C data types with unformatted input/output functions and use of if() statement.

TITLE:

Write a program to find the largest and smallest among three entered numbers and also display whether the identified largest/smallest number is even or odd.

Objective:

- To know different types of data types, operation,
- To be familier with if() statement.

Problem analysis:

Based on given problem, our program must define three variables of type int. Different operation should be performed using if() statement.

Input variables	**Necessary header files/functions/macros**
n1, n2, n3 (int type)	stdio.h coino.h printf() scanf() if()

Algorithm:

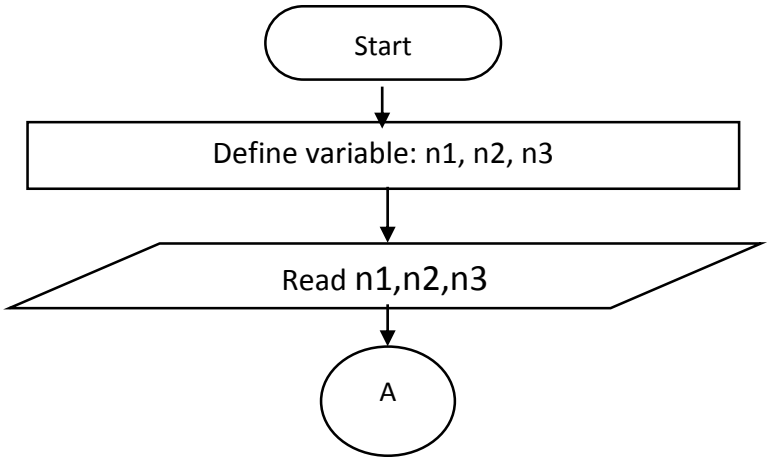
1. Start
2. Define variables: n1, n2, n3
3. Take input from keyboard for all the input variables
4. Print:

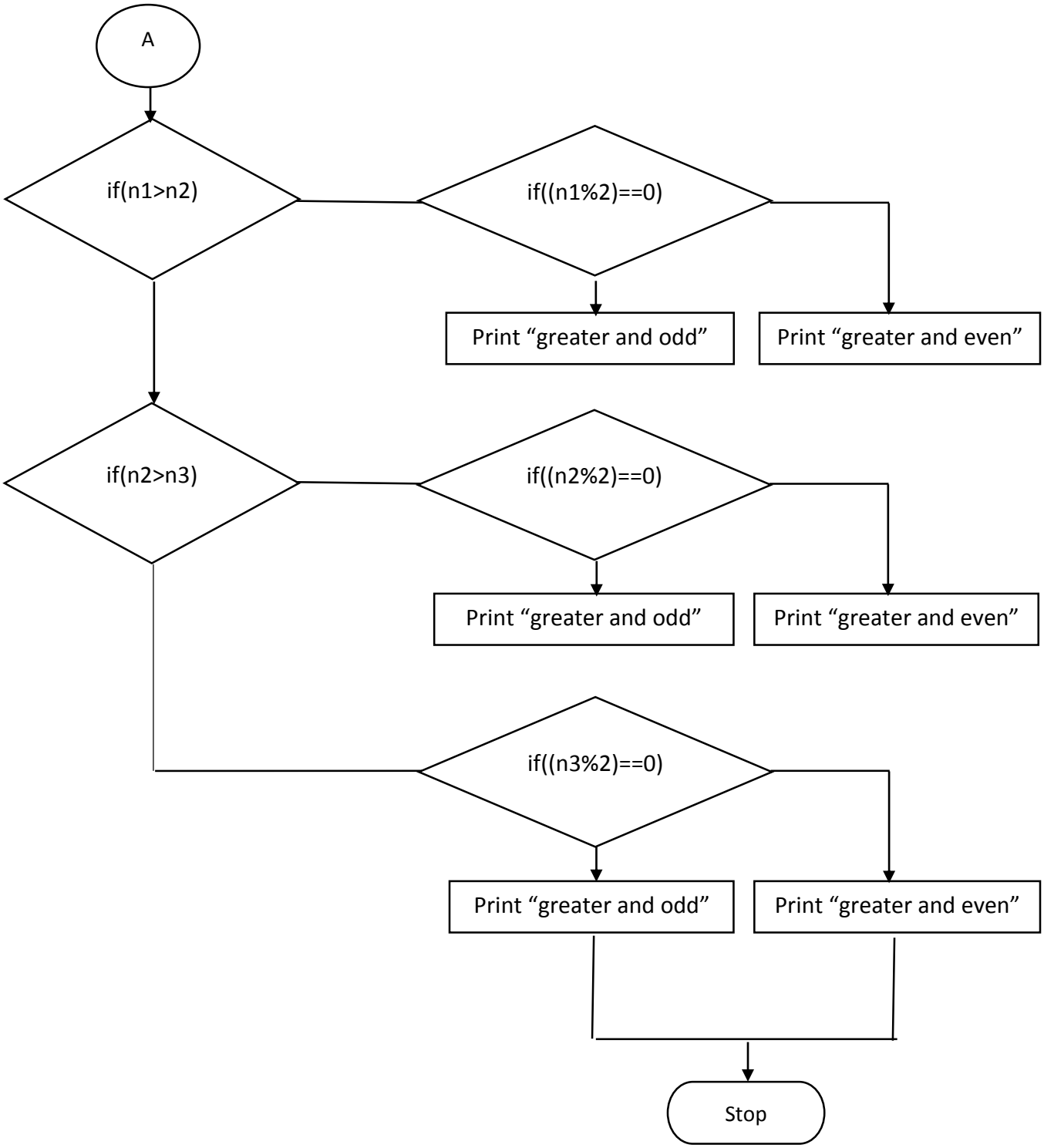
```
if(n1>n2)
   {
      if((n1%2)==0)
      printf("The greatest number %d is even.\n",n1);
```

```
    else
    printf("The greatest number %d is odd.\n",n1);
    exit(0);
  }
  if(n2>n3)
  {
    if((n2%2)==0)
    printf("The greatest number %d is even.\n",n2);
    else
    printf("The greatest number %d is odd.\n",n2);
    exit(1);
  }

  {
    if((n3%2)==0)
    printf("The greatest number %d is even.\n",n3);
    else
    printf("The greatest number %d is odd.\n",n3);
  }
```

5. Stop

Flowchart:



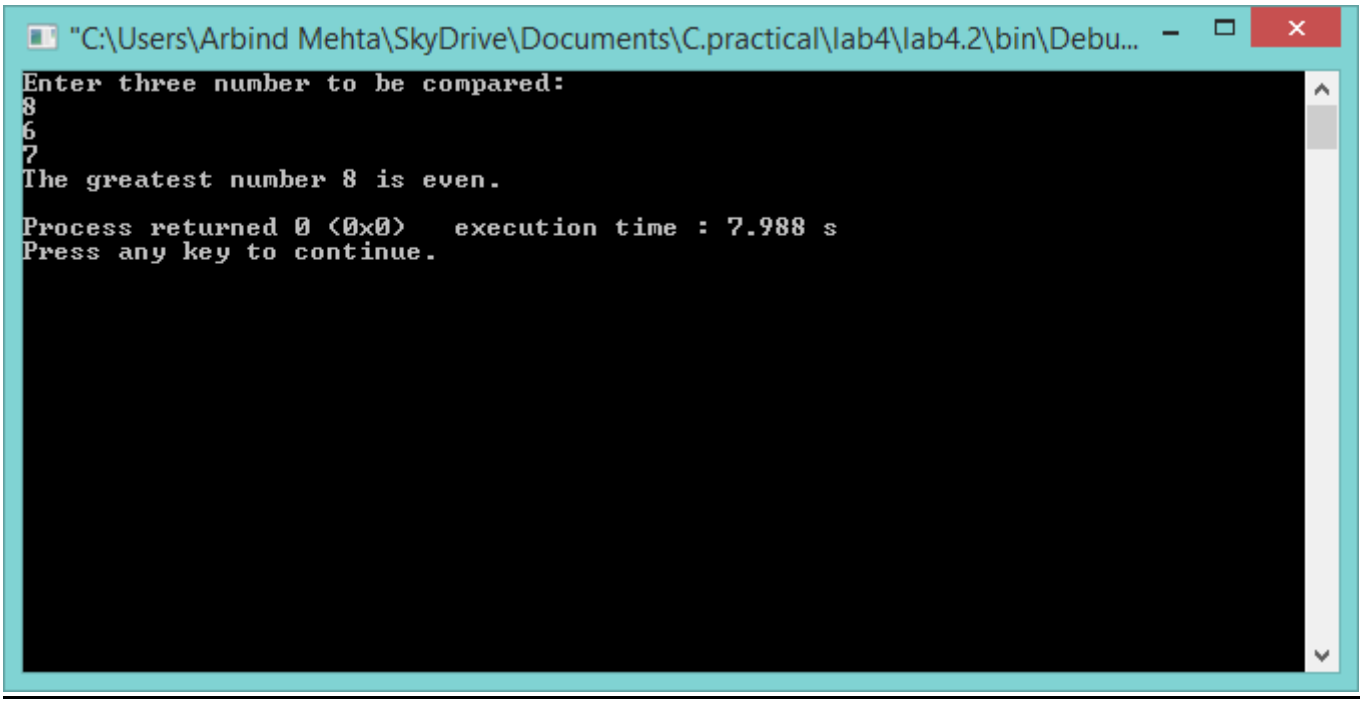

A
if(n1>n2)
if((n1%2)==0)
Print “greater and odd”
Print “greater and even”
if(n2>n3)
if((n2%2)==0)
Print “greater and odd”
Print “greater and even”
if((n3%2)==0)
Print “greater and odd”
Print “greater and even”
Stop

Code:

```
#include <stdio.h>
#include <stdlib.h>

int main()
{
   int n1,n2,n3;

   printf("Enter three number to be compared:\n");
   scanf("%d%d%d",&n1,&n2,&n3);
   if(n1>n2)
   {
      if((n1%2)==0)
      printf("The greatest number %d is even.\n",n1);
      else
      printf("The greatest number %d is odd.\n",n1);
      exit(0);
   }
   if(n2>n3)
   {
      if((n2%2)==0)
      printf("The greatest number %d is even.\n",n2);
      else
      printf("The greatest number %d is odd.\n",n2);
      exit(1);
   }

   {
```

```
    if((n3%2)==0)
    printf("The greatest number %d is even.\n",n3);
    else
    printf("The greatest number %d is odd.\n",n3);
  }
 return 0;
}
```

Output (Compilation, Debugging and Testing):



Discussion & Conclusion:

In this lab of C programming, based on the focused objective(s) to understand about C data types with formatted input/output functions and if() statement in C.

TITLE:

Write a program to get input of two or higher digit integer number and display in reverse order.

Objective:

- ❖ To know different types of data types, operation,
- ❖ To be familier with swap operation while statement in C.

Problem analysis:

Based on given problem, our program must define five variables of type int. Different operation should be performed using while and if statement in c.

Input variables	Necessary header files/functions/macros

n,rem,ans=0,count=0,temp (int type)	stdio.h
	coino.h
	scanf()
	printf()
	if()
	while()

Algorithm:

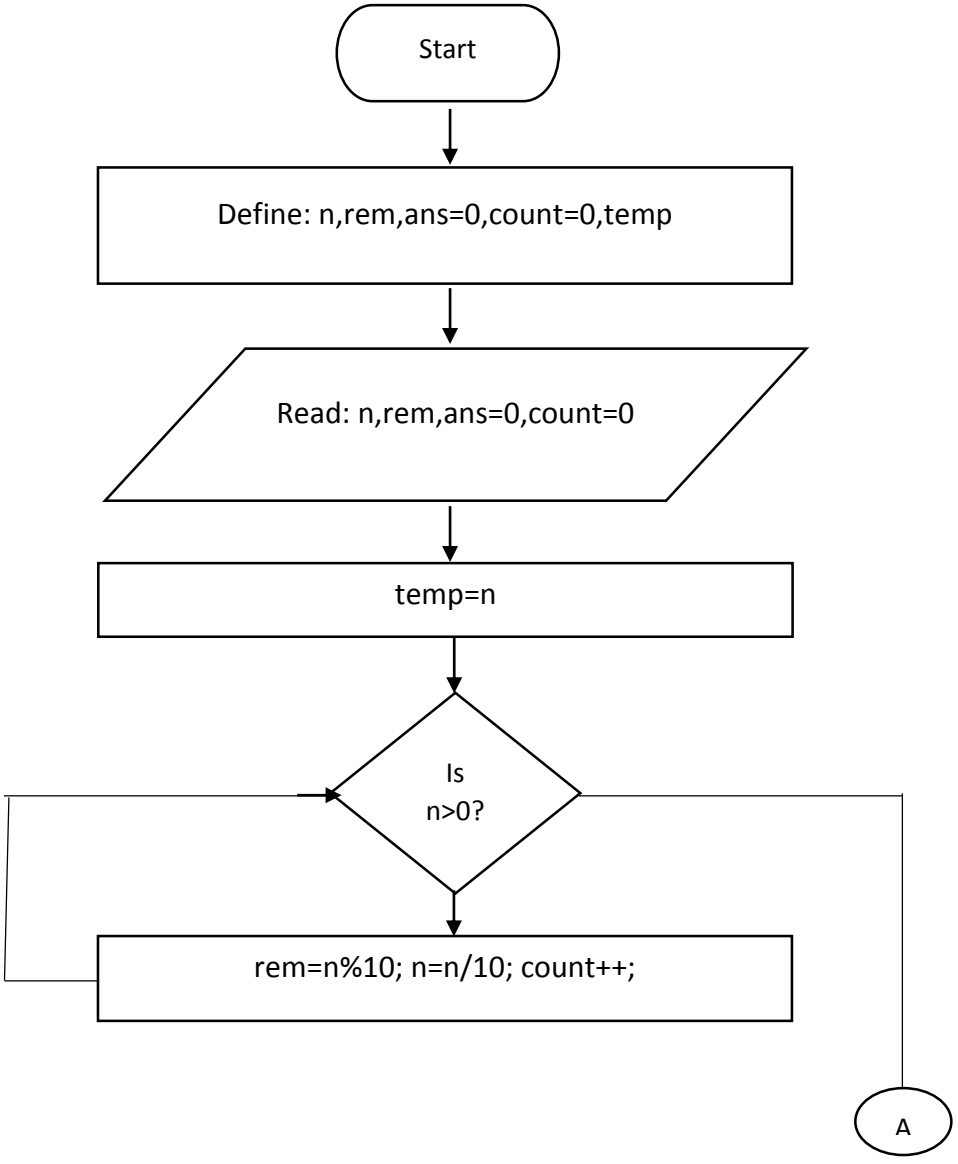
1. Start
2. Define variable: nam[30], add[50],wt[5],ht[5],ag[3]
3. Read variables:

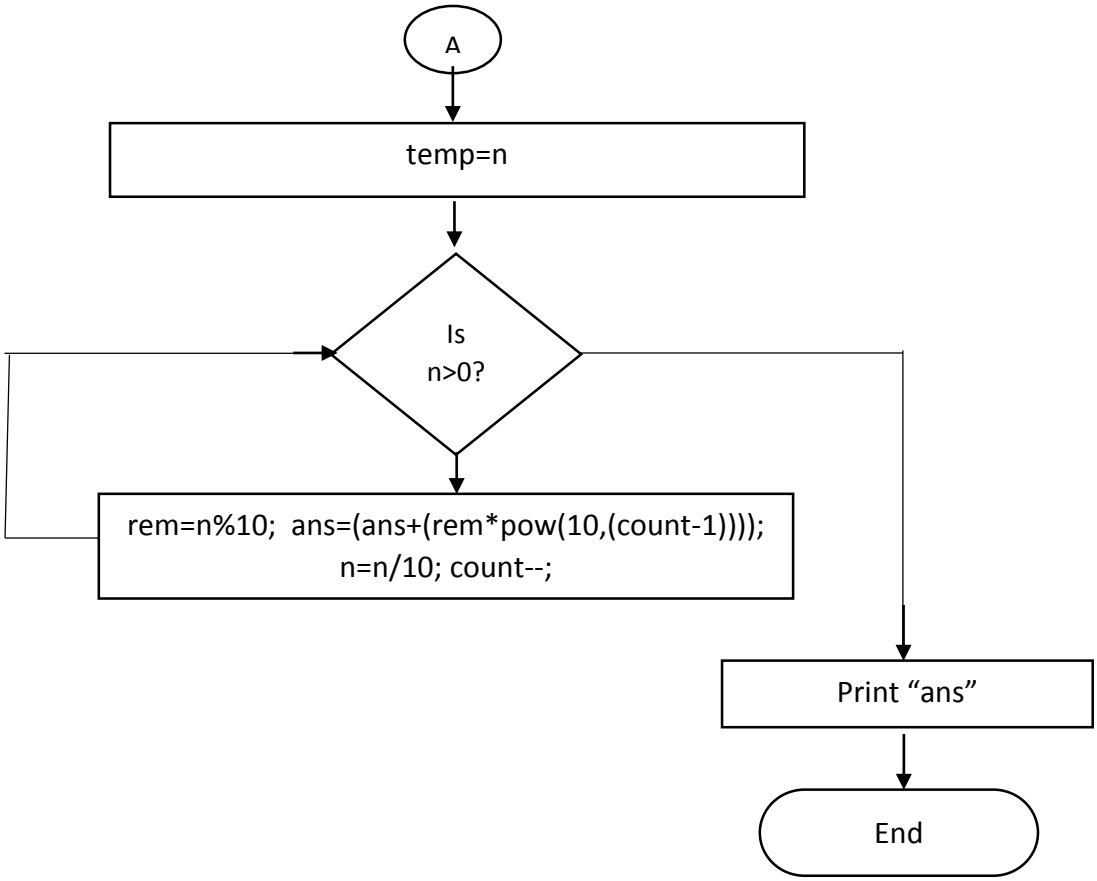
```
temp=n;
  while(n>0)
  {
    rem=n%10;
    n=n/10;
    count++;
  }
  n=temp;
  while(n>0)
  {
    rem=n%10;
    ans=(ans+(rem*pow(10,(count-1))));
    n=n/10;
```

```
        count--;
    }
```

4. Display values of ans
5. Stop.

Flowchart:



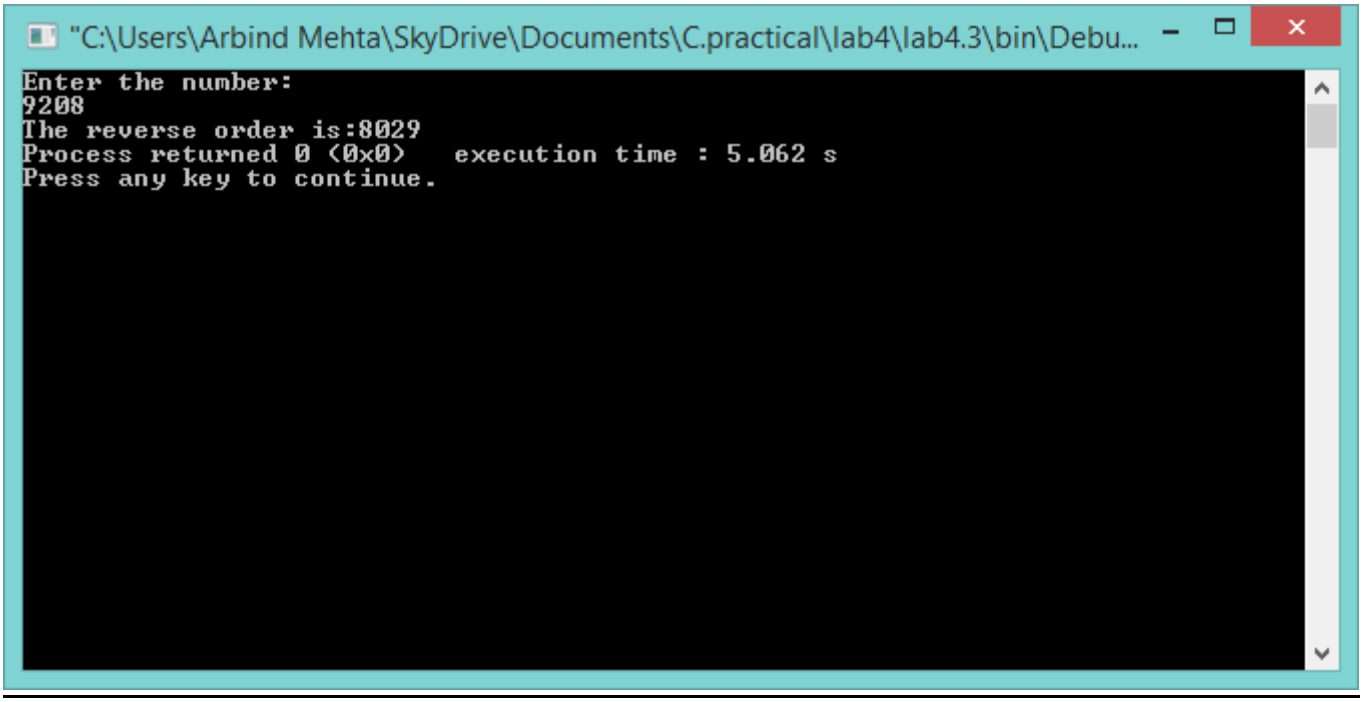


Code:

```
#include <stdio.h>
#include <stdlib.h>
#include <math.h>

int main()
{
   int n,rem,ans=0,count=0,temp;

   printf("Enter the number:\n");
   scanf("%d",&n);
   temp=n;
   while(n>0)
```

```
    {
        rem=n%10;
        n=n/10;
        count++;
    }
    n=temp;
    while(n>0)
    {
        rem=n%10;
        ans=(ans+(rem*pow(10,(count-1))));
        n=n/10;
        count--;
    }
    printf("The reverse order is:%d",ans);
    return 0;
}
```

Output (Compilation, Debugging and Testing):



Discussion & Conclusion:

In this lab of C programming, based on the focused objective(s) to understand about C data types with if and while statement in C.

TITLE:

Write a program to check whether input alphabet is vowel or not using if-else and switch statement.

Objective:

- To know different types of data types, operation,
- To be familier with if operation in C.

Problem analysis:

Based on given problem, our program must define one variables of type char. Different operation should be performed using if statement.

Input variables	**Necessary header files/functions/macros**
ch (char type)	stdio.h coino.h printf() if() scanf()

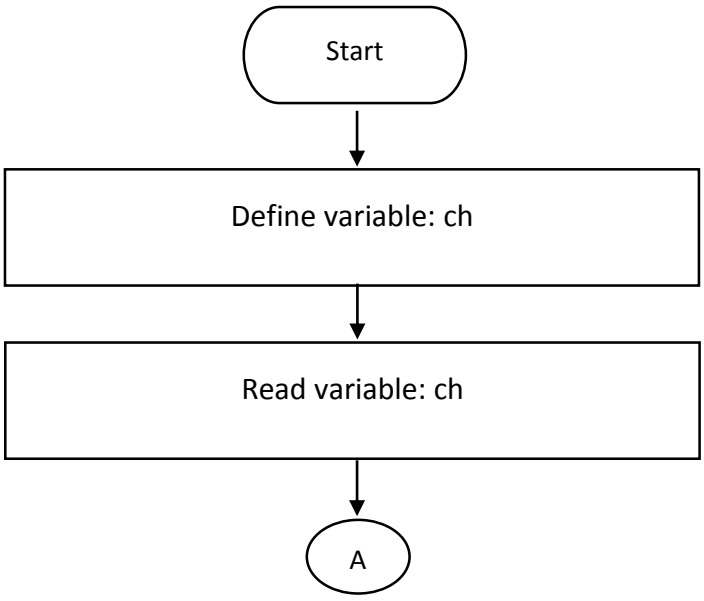
Algorithm(using if-else statement):

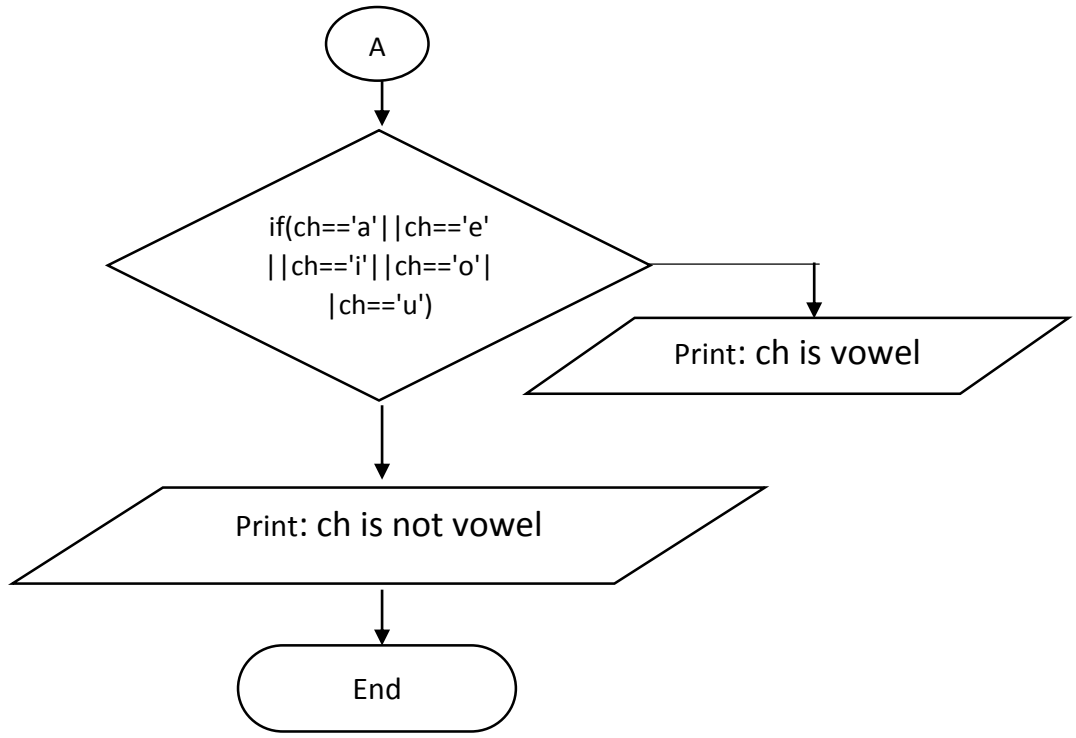
1. Start
2. Define variable: ch
3. Read: ch
   if(ch=='a'||ch=='e'||ch=='i'||ch=='o'||ch=='u')
   print: ch is vowel
   else
   print: ch is not vowel
4. Stop.

Algorithm(using switch statement):

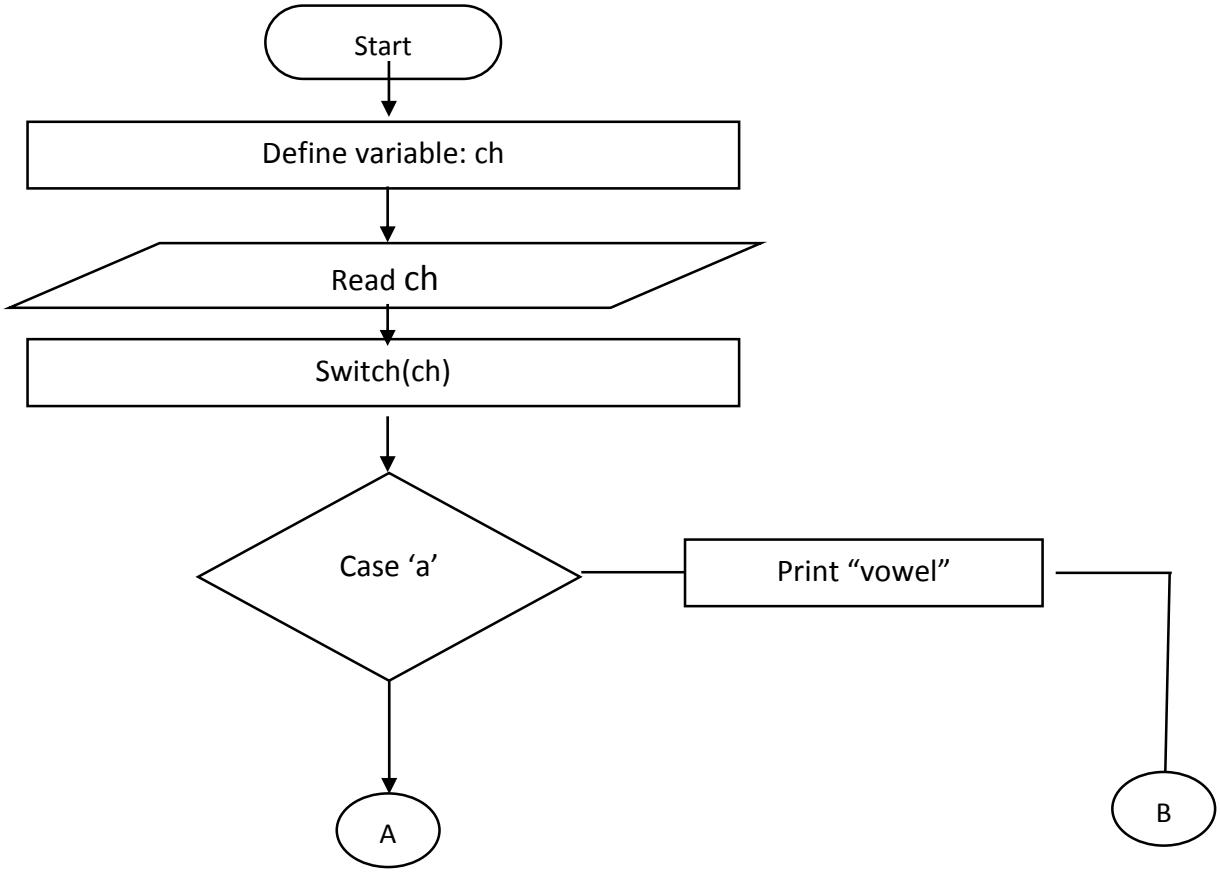
1. Start
2. Define variable: ch
3. Read: ch
   switch(ch)
   {
   case 'a': print: Vowel
   break;
   case 'e': print: Vowel
   break;
   case 'i': print: Vowel
   break;
   case 'o': print: Vowel
   break;
   case 'u': print: Vowel
   break;
   default: print: not vowel
   }
4. Stop.

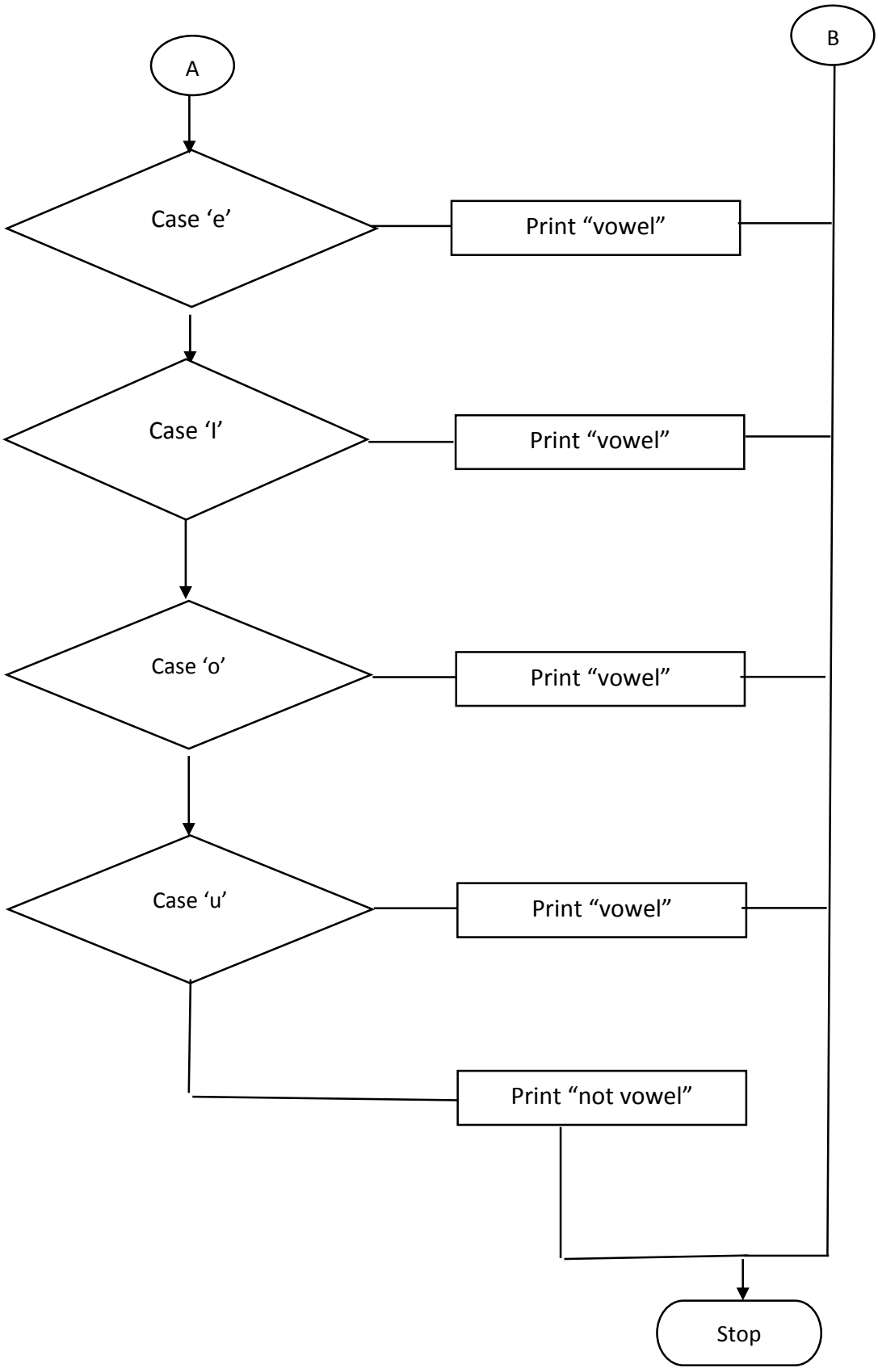
Flowchart(using if-else statement):





Flowchart(using switch statement):

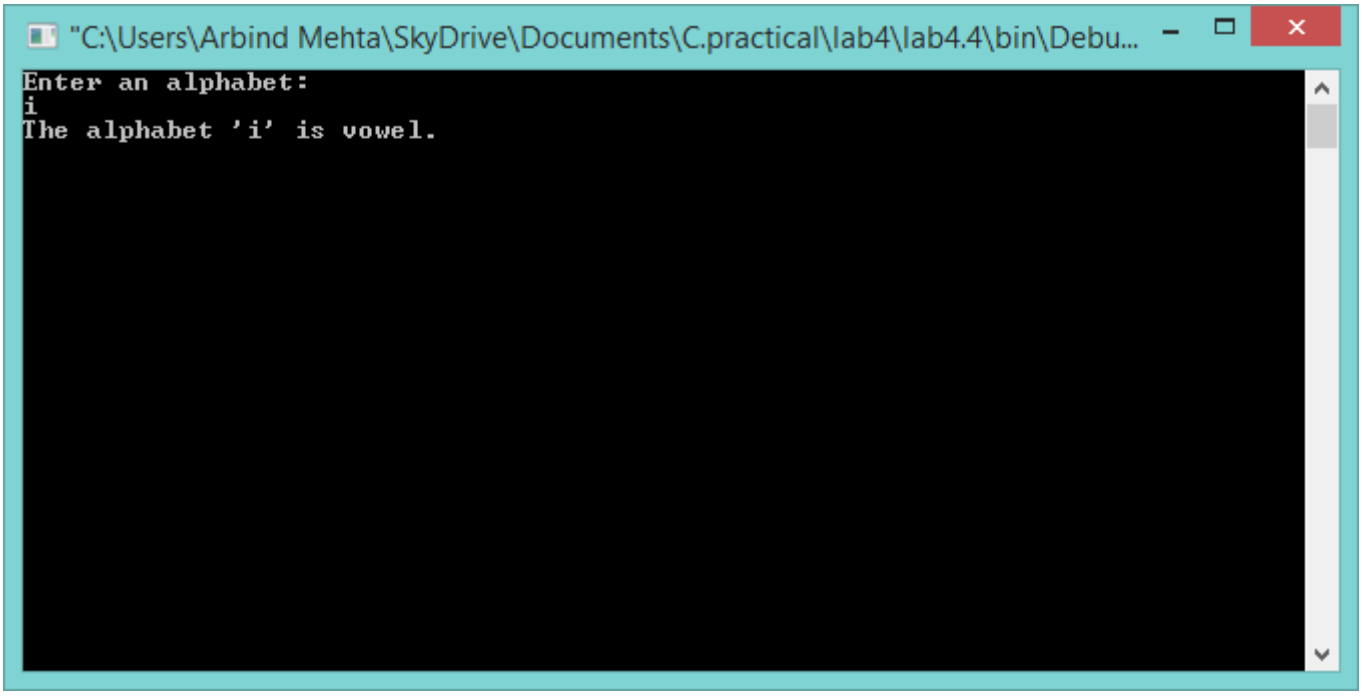



A
B
Case ‘e’
Print “vowel”
Case ‘I’
Print “vowel”
Case ‘o’
Print “vowel”
Case ‘u’
Print “vowel”
Print “not vowel”
Stop

Code(using if-else statement):

```
#include <stdio.h>
#include <stdlib.h>

int main()
{
    char ch;
   printf("Enter an alphabet:\n");
    scanf("%c",&ch);

    if(ch=='a'||ch=='e'||ch=='i'||ch=='o'||ch=='u')
    printf("The alphabet '%c' is vowel.",ch);
    else
printf("The alphabet '%c' is not vowel.",ch);
    getch();
 return 0;
}
```

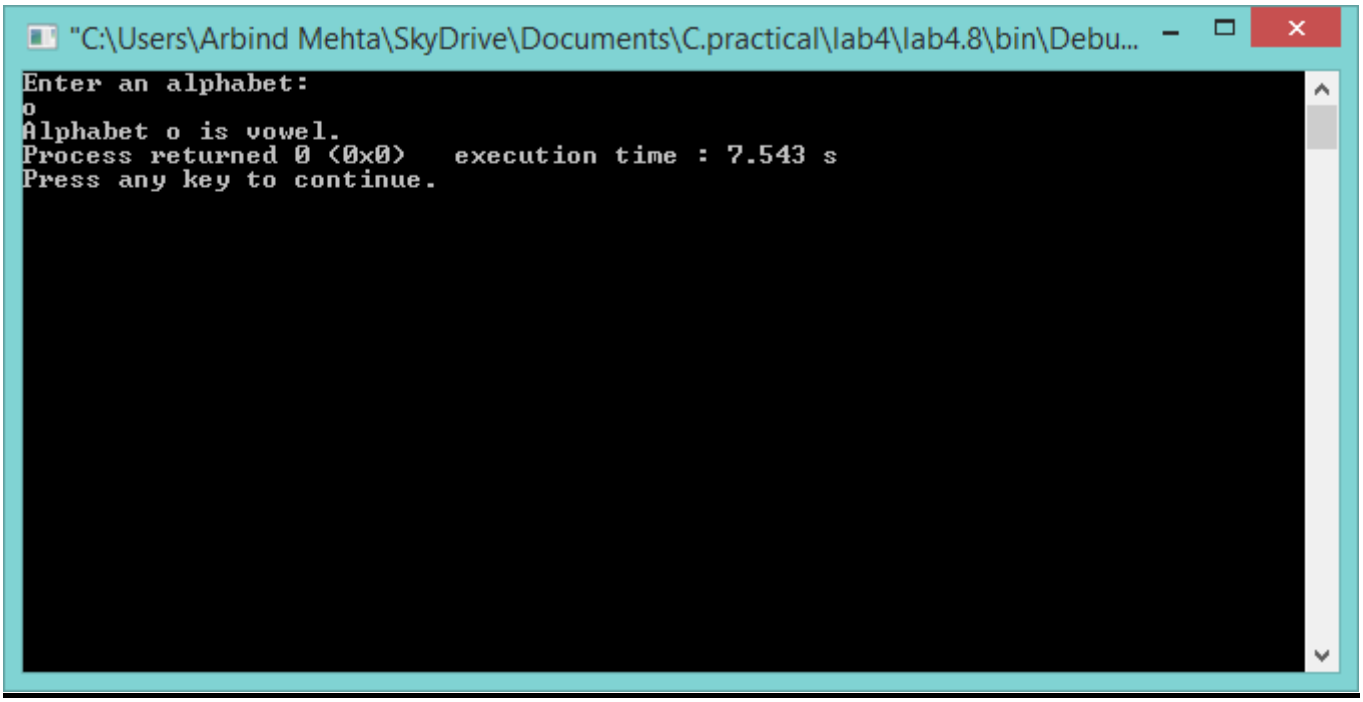
Output (Compilation, Debugging and Testing):



Code(using switch statement):

```
#include <stdio.h>
#include <stdlib.h>

int main()
{
   char ch;
   printf("Enter an alphabet:\n");
   ch=getchar();

   switch(ch)
   {
      case 'a': printf("Alphabet %c is vowel.",ch);
      break;
      case 'e': printf("Alphabet %c is vowel.",ch);
      break;
      case 'i': printf("Alphabet %c is vowel.",ch);
      break;
      case 'o': printf("Alphabet %c is vowel.",ch);
      break;
      case 'u': printf("Alphabet %c is vowel.",ch);
      break;
      default: printf("Alphabet %c is not vowel.",ch);
   }
   return 0;
}
```

Output (Compilation, Debugging and Testing):



Discussion & Conclusion:

In this lab of C programming, based on the focused objective(s) to understand about C data types, different operation, with if and switch statement in C.

TITLE:

Write a program that asks a number and test the number whether it is multiple of 5 or not, divisible by 7 but not by eleven.

Objective:

- To know different types of data types, operation,
- To be familier if() statement in C.

Problem analysis:

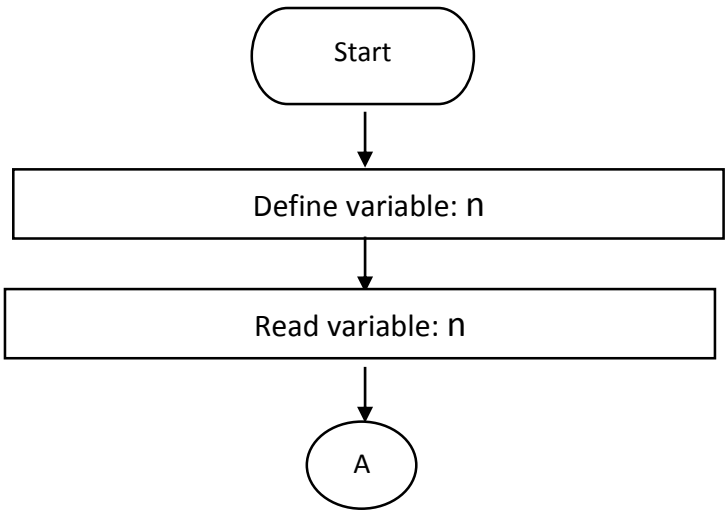
Based on given problem, our program must define one variables of type int. Different operation should be performed if() statement.

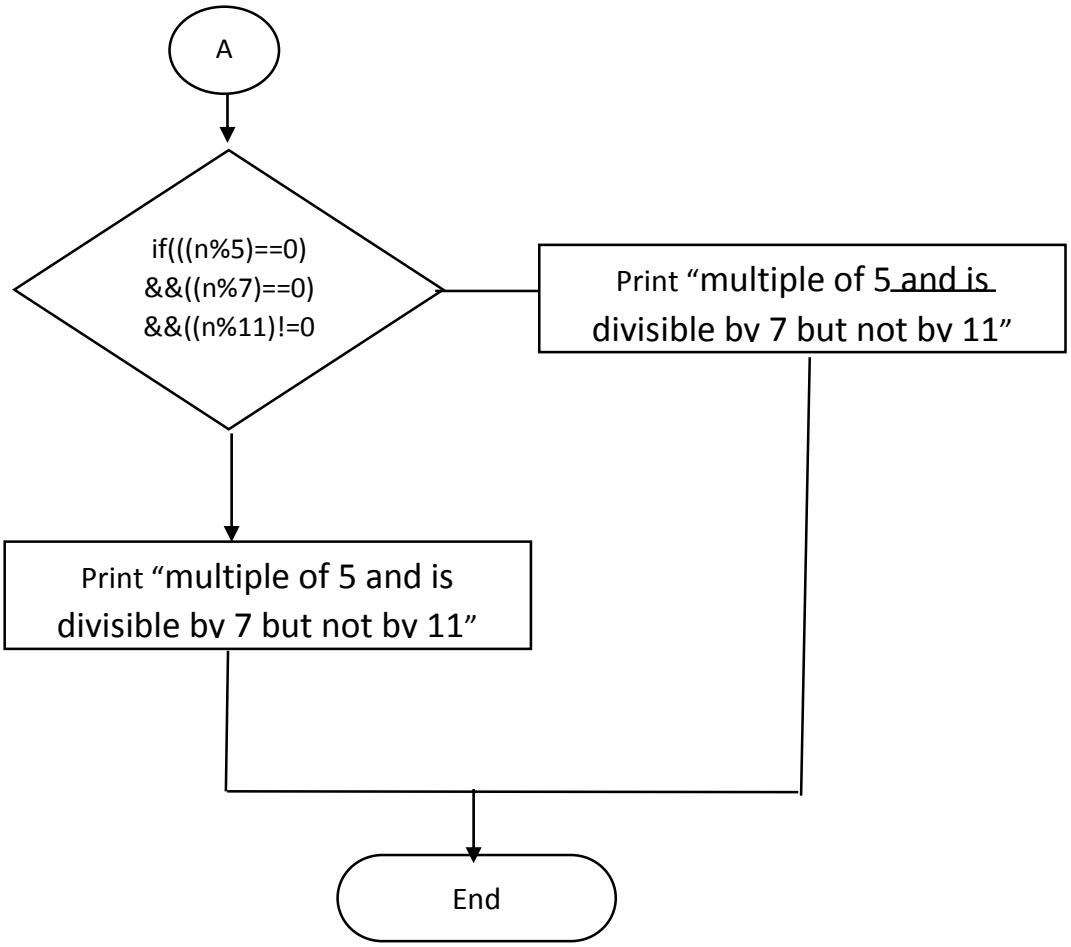
Input variables	Necessary header files/functions/macros
n (int type)	stdio.h coino.h printf() scanf() if()

Algorithm:

1. Start
2. Define variable: n
   if(((n%5)==0)&&((n%7)==0)&&((n%11)!=0))
   print: The n is multiple of 5 and is divisible by 7 but not by 11.
   else
   The n is not multiple of 5 and is divisible by 7 but not by 11.
3. Stop.

Flowchart:



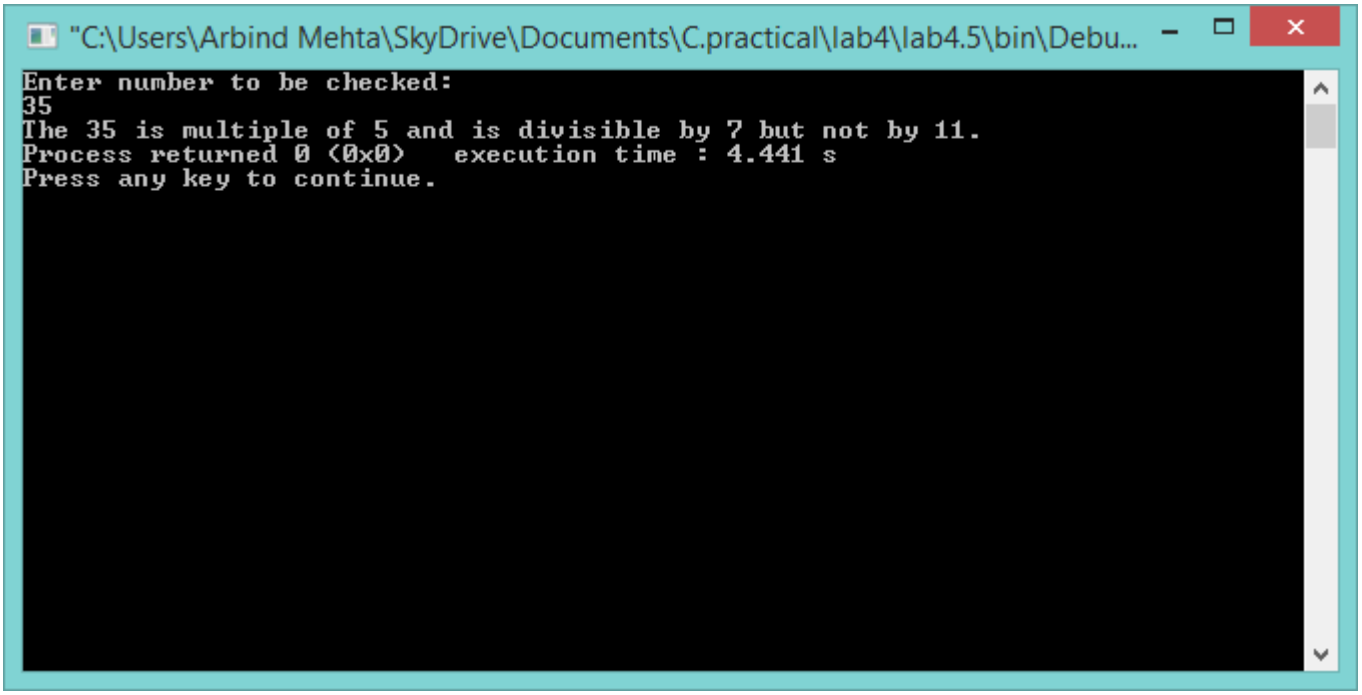


Code:

```
#include <stdio.h>
#include <stdlib.h>

int main()
{
   int n;

   printf("Enter number to be checked:\n");
   scanf("%d",&n);

   if(((n%5)==0)&&((n%7)==0)&&((n%11)!=0))
```

```
    printf("The %d is multiple of 5 and is divisible by 7 but not by 11.",n);
    else
    printf("The %d is not multiple of 5 and is divisible by 7 but not by 11.",n);

    return 0;
}
```

Output (Compilation, Debugging and Testing):



Discussion & Conclusion:

In this lab of C programming, based on the focused objective(s) to understand about C data types, different operation, with if() statement in C.

TITLE:

Write a program to check whether the entered year is leap year or not (a year is leap if it is divisible by 4 and divisible by 100 or 400.)

Objective:

- To know different types of data types, operation,
- To be familier with if() statement in C.

Problem analysis:

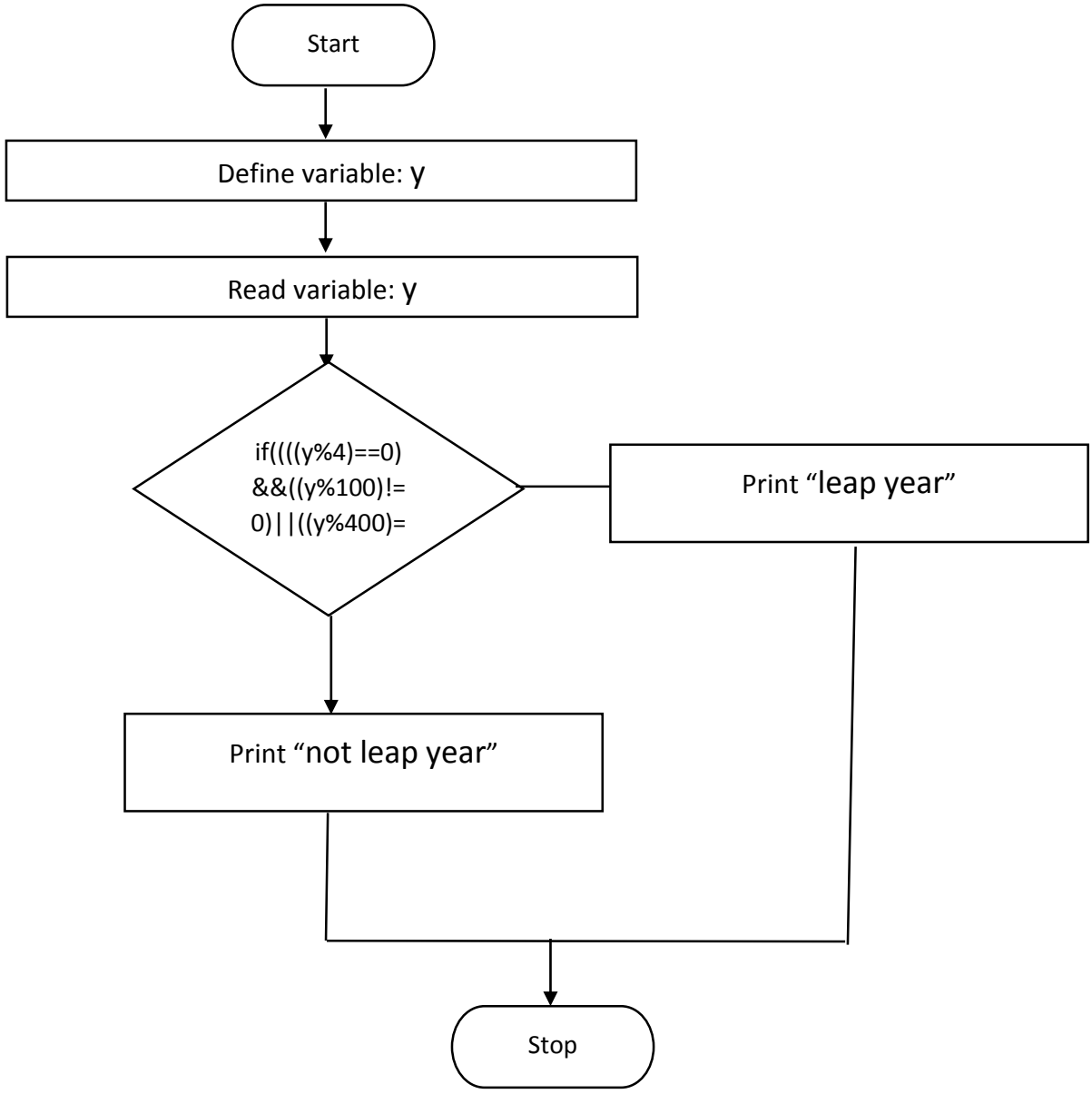
Based on given problem, our program must define one variables of type int. Different operation should be performed using if() statement.

Input variables	**Necessary header files/functions/macros**
y(int type)	stdio.h coino.h printf() scanf() if()

Algorithm:

1. Start
2. Define variable:y
3. Read: y
   if((((y%4)==0)&&((y%100)!=0)||((y%400)==0)))
   print: Leap year.
   else
   print: Not leap year.
4. Stop.

Flowchart:

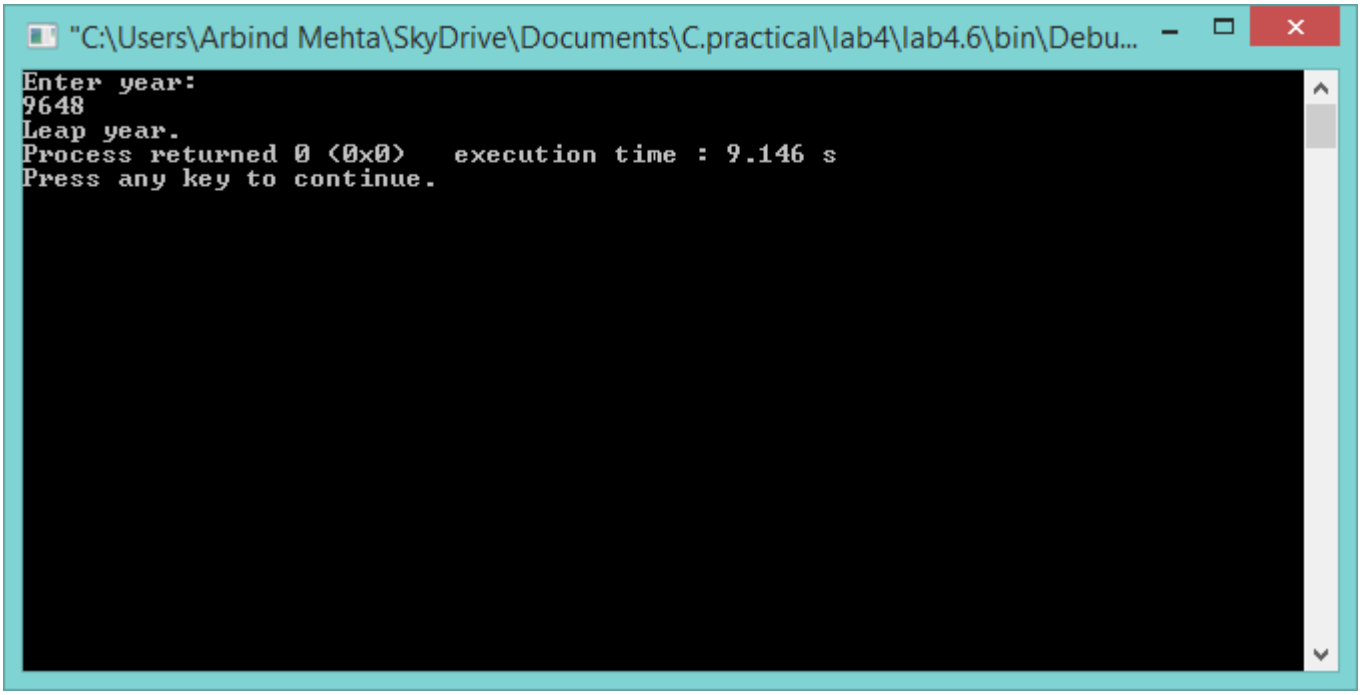


Code:

```
#include <stdio.h>
int main()
{
   int y;
  printf("Enter year:\n");
   scanf("%d",&y);

   if((((y%4)==0)&&((y%100)!=0)||((y%400)==0)))
     printf("Leap year.");
```

```
    else
    printf("Not leap year.");
    return 0;
}
```

Output (Compilation, Debugging and Testing):



Discussion & Conclusion:

In this lab of C programming, based on the focused objective(s) to understand about C data types, different operation, if() statement in C.

TITLE:]

Write a program to read the values of coefficients a, b and c of a quadratic equation ax2+bx+c=0 and find roots of the equation.

Objective:

- To know different types of data types, operation,
- To be familier with different inbuilt function, conditional operator in C.

Problem analysis:

Based on given problem, our program must define ten variables of type float. Different operation should be performed using If() statement.

Input variables	Necessary header files/functions/macros
x1,x2,r2,i2,i1,r1,a,b,c,d (float type)	stdio.h coino.h if() scanf() printf()

Algorithm:

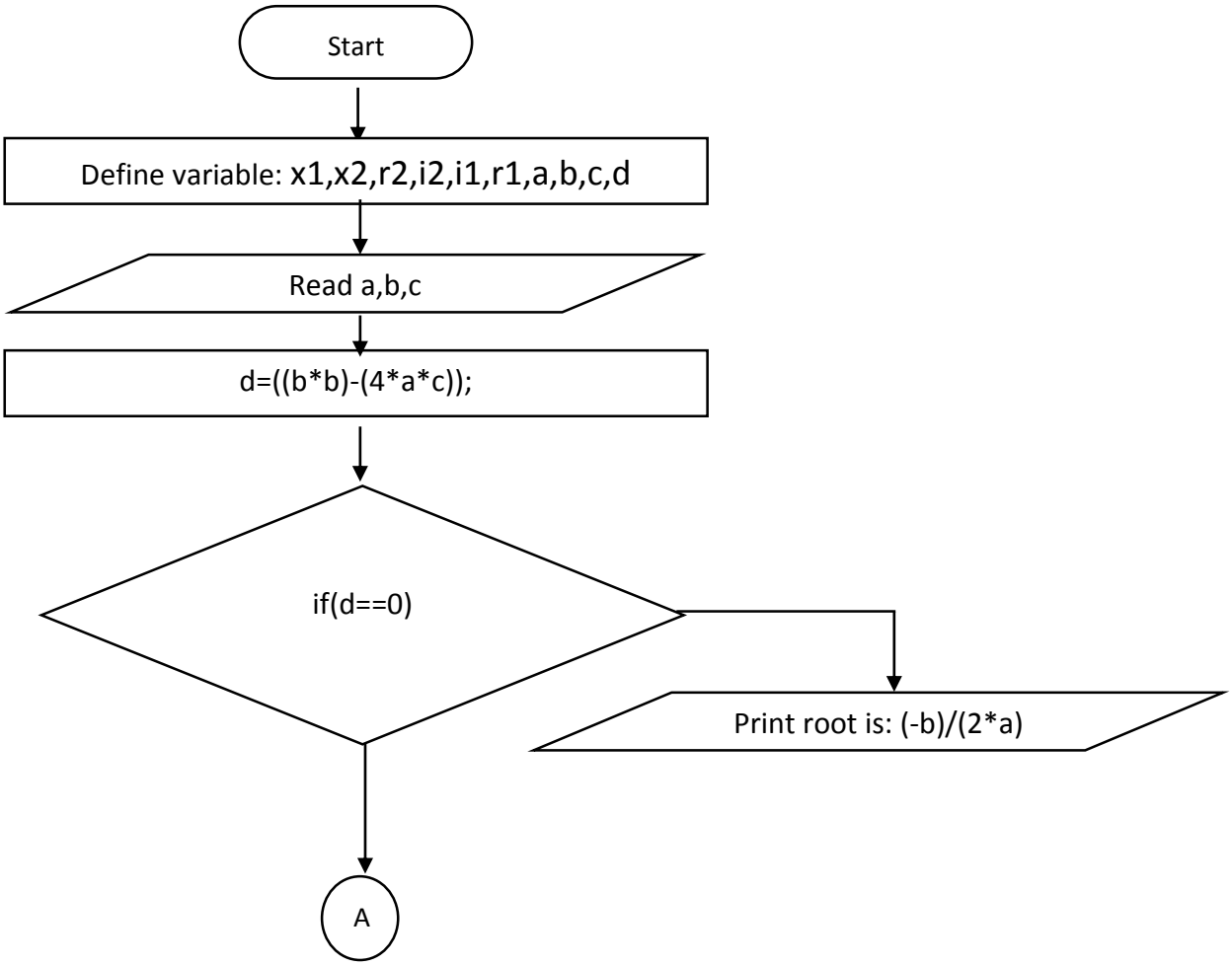
1. Start
2. Define variable: x1,x2,r2,i2,i1,r1,a,b,c,d
3. Read variables: a,b,c

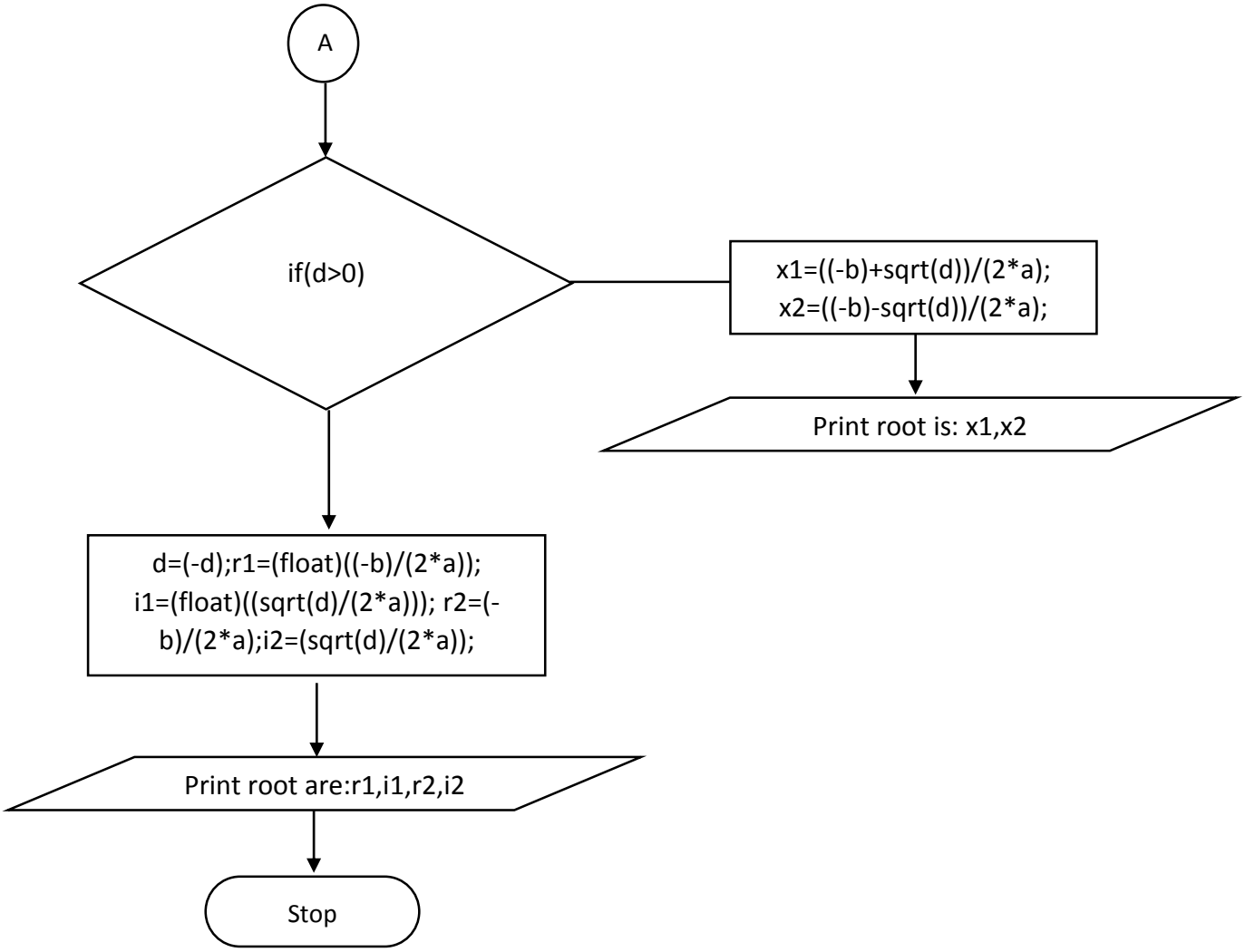
```
d=((b*b)-(4*a*c));
  if(d==0)
  {
     Print: Root is:(-b)/(2*a))
  }
  else
  if(d>0)
  {
     x1=((-b)+sqrt(d))/(2*a);
     x2=((-b)-sqrt(d))/(2*a);
  print: Roots are: x1,x2)
 }
  else
  {
    d=(-d);
```

```
        r1=(float)((-b)/(2*a));
        i1=(float)((sqrt(d)/(2*a)));
        r2=(-b)/(2*a);
        i2=(sqrt(d)/(2*a));
        print: Roots are :r1,i1,r2,i2
    }
```

4. Stop.

Flowchart:



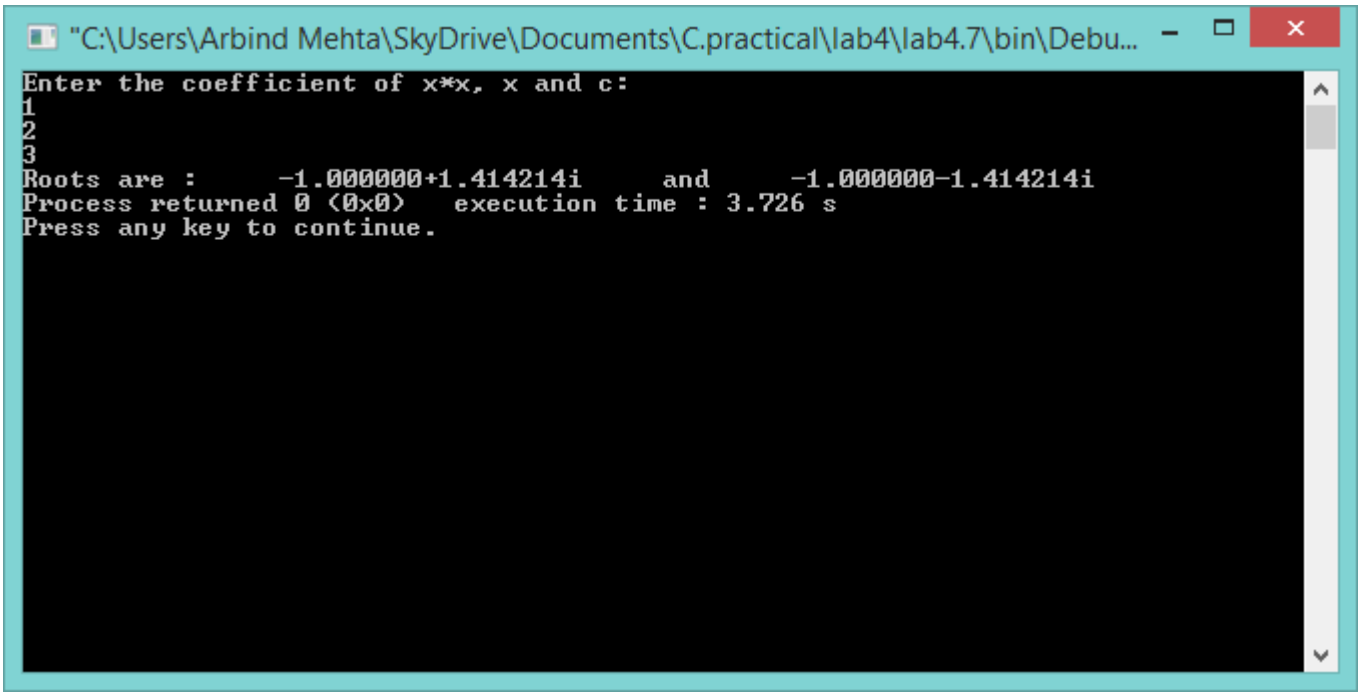


Code:

```
#include <stdio.h>
#include <math.h>
int main()
{
 float x1,x2,r2,i2,i1,r1,a,b,c,d;
printf("Enter the coefficient of x*x, x and c:\n");
   scanf("%f%f%f",&a,&b,&c);
   d=((b*b)-(4*a*c));
```

```
   if(d==0)
   {
      printf("Root is:%f",(-b)/(2*a));
   }
   else
   if(d>0)
   {
      x1=((-b)+sqrt(d))/(2*a);
      x2=((-b)-sqrt(d))/(2*a);
   printf("Roots are:\t%fand\t%f",x1,x2);

   }
   else
   {
     d=(-d);
      r1=(float)((-b)/(2*a));
      i1=(float)((sqrt(d)/(2*a)));    //type casting
      r2=(-b)/(2*a);
      i2=(sqrt(d)/(2*a));
      printf("Roots are :\t%f+%fi\tand\t%f-%fi",r1,i1,r2,i2);
   }
return 0;
}
```

Output (Compilation, Debugging and Testing):



Discussion & Conclusion:

In this lab of C programming, based on the focused objective(s) to understand about C data types, different operation, different inbuilt function, with if() statement in C.

***