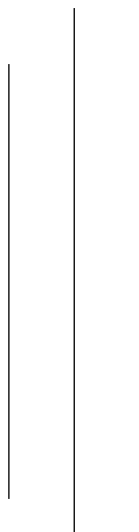




TRIBHUVAN UNIVERSITY
Faculty of Management
Shanker Dev Campus

A lab report on Discrete Structure Algorithms using C Programming



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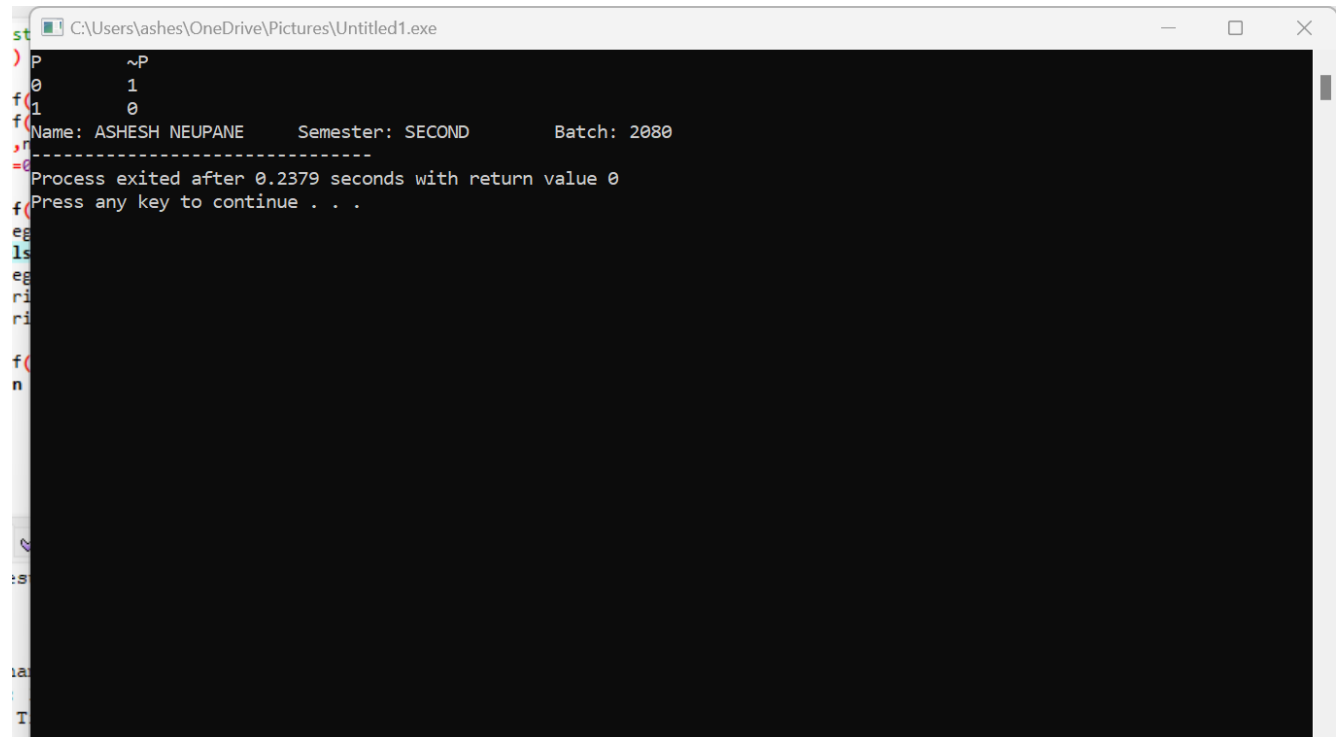
(LAB – 1 : Digital Circuit)

Write a program to print the truth table of Negation.

Source Code:

```
#include<stdio.h>
int main()
{
    printf("P \t ~P");
    printf("\n");
    int p,negp;
    for(p=0;p<=1;p++)
    {
        if(p==0)
            negp=1;
        else
            negp=0;
        printf("%d \t %d",p,negp);
        printf("\n");
    }
    printf("Name: ASHESH NEUPANE \t Semester: SECOND \t Batch: 2080");
    return 0;
}
```

Output Screen:



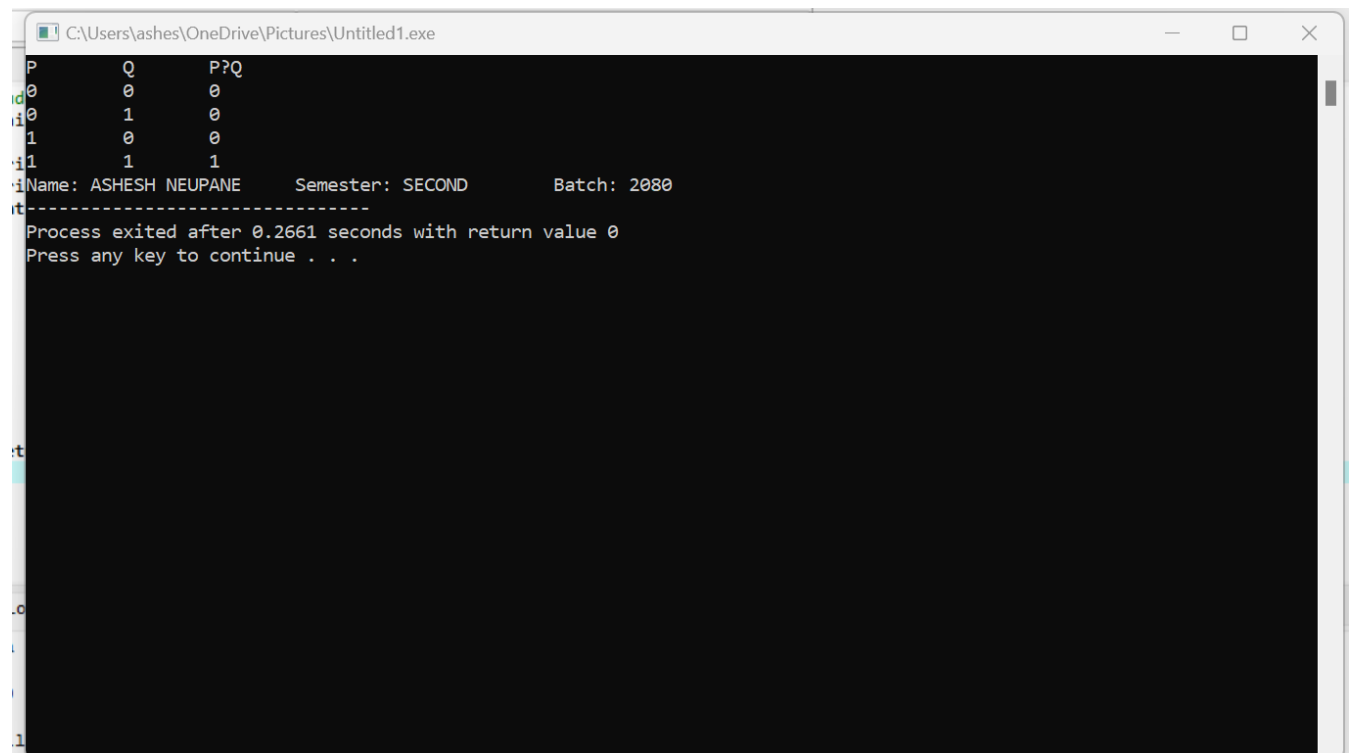
```
st
) P      ~P
0        1
f(       0
f(
Name: ASHESH NEUPANE      Semester: SECOND      Batch: 2080
-----
Process exited after 0.2379 seconds with return value 0
Press any key to continue . . .
eg
ls
eg
ri
ri
f(
n
:st
at
T
```

Write a program to print the truth table of conjunction.

Source Code:

```
#include<stdio.h>
int main()
{
    printf("P \t Q \t P^Q");
    printf("\n");
    int p,q,conjunction;
    for(p=0;p<=1;p++)
    {
        for(q=0;q<=1;q++)
        {
            conjunction=p*q;
            printf("%d \t %d \t %d",p,q,conjunction);
            printf("\n");
        }
    }
    printf("Name: ASHESH NEUPANE \t Semester: SECOND \t Batch: 2080");
    return 0;
}
```

Output Screen:



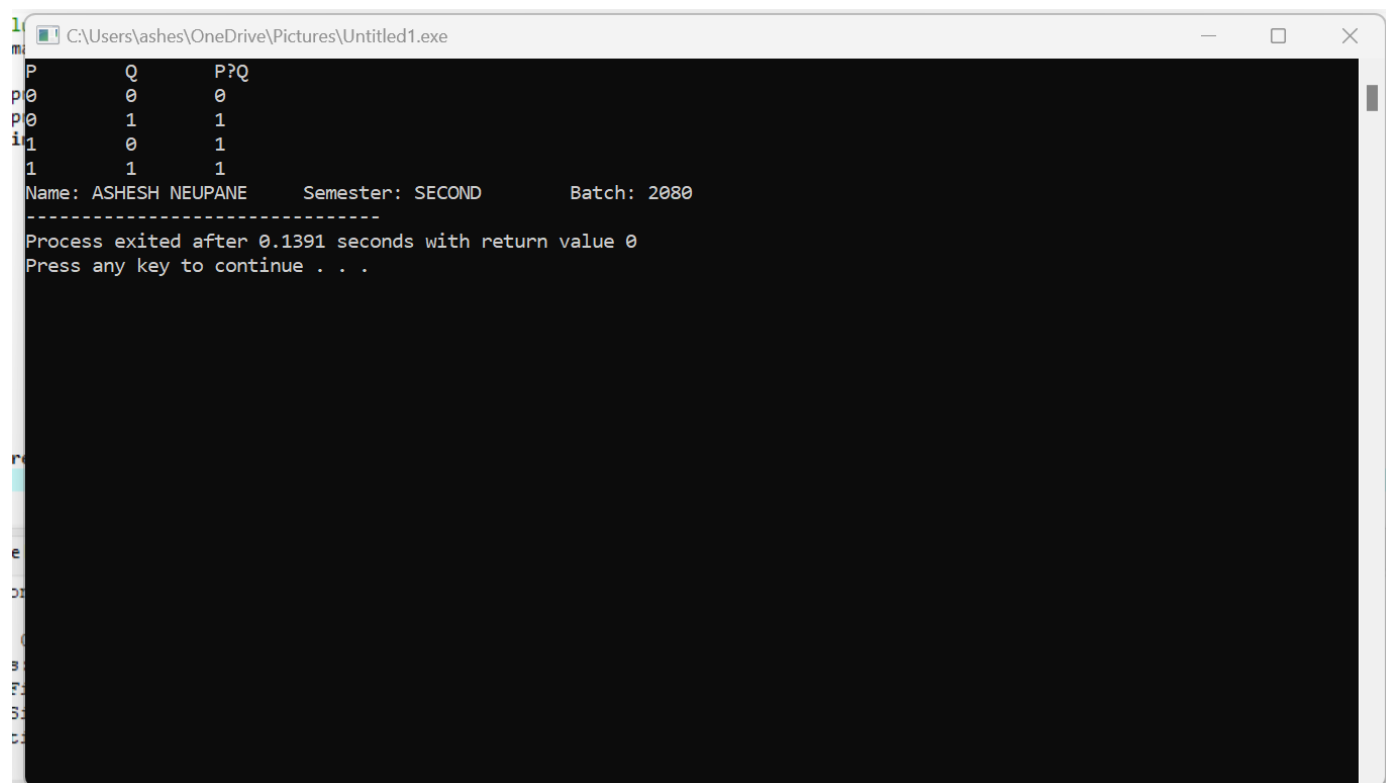
```
P      Q      P^Q
0      0      0
0      1      0
1      0      0
1      1      1
Name: ASHESH NEUPANE      Semester: SECOND      Batch: 2080
-----
Process exited after 0.2661 seconds with return value 0
Press any key to continue . . .
```

Write a program to print the truth table of disjunction.

Source Code:

```
#include<stdio.h>
int main()
{
    printf("P \t Q \t P∨Q");
    printf("\n");
    int p,q,disjunction;
    for(p=0;p<=1;p++)
    {
        for(q=0;q<=1;q++)
        {
            if(p==0 && q==0)
                disjunction=0;
            else
                disjunction=1;
            printf("%d \t %d \t %d",p,q,disjunction);
            printf("\n");
        }
    }
    printf("Name: ASHESH NEUPANE \t Semester: SECOND \t Batch: 2080");
    return 0;
}
```

Output Screen:



```

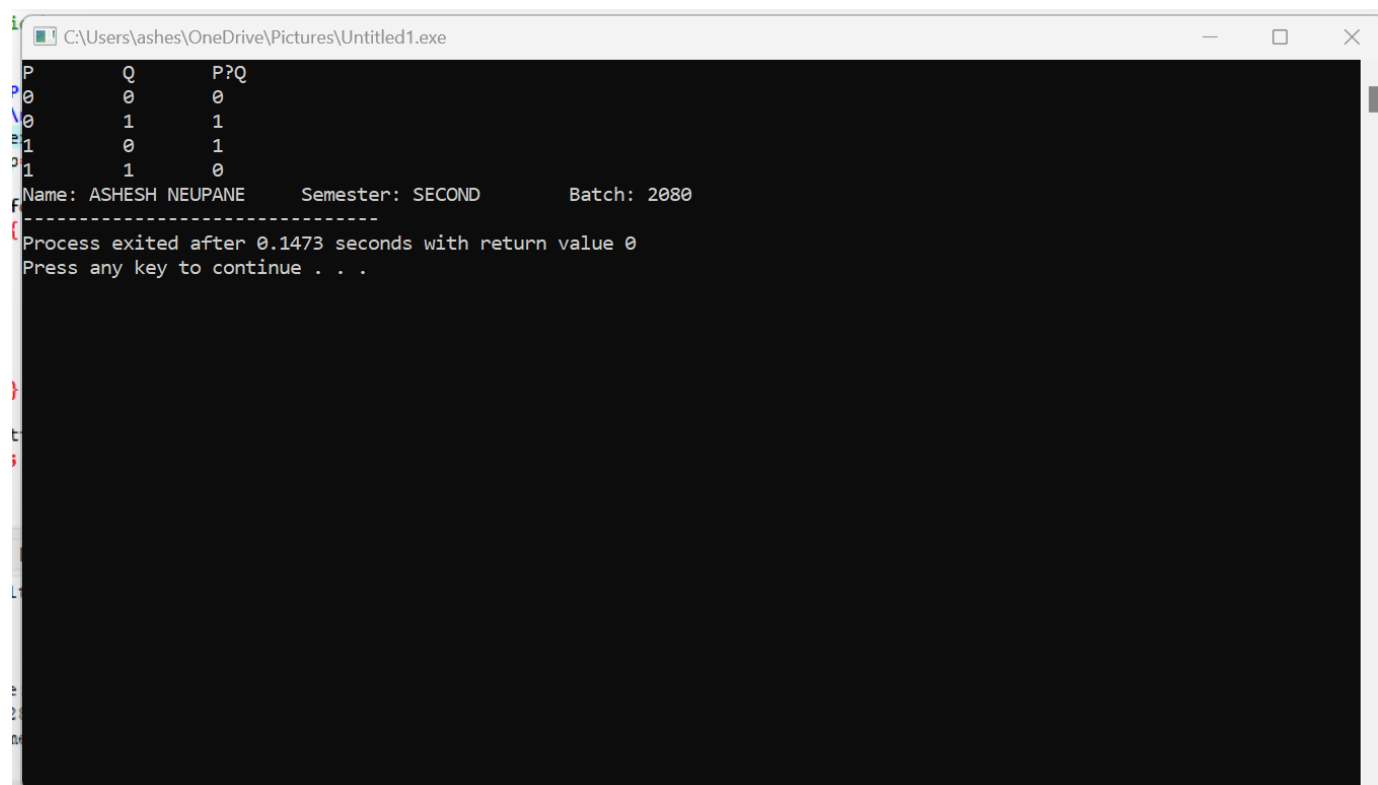
P      Q      P∨Q
p 0    0      0
p 0    1      1
p 1    0      1
p 1    1      1
Name: ASHESH NEUPANE      Semester: SECOND      Batch: 2080
-----
Process exited after 0.1391 seconds with return value 0
Press any key to continue . . .
```

Write a program to print truth table of Exclusive OR.

Source Code:

```
#include<stdio.h>
int main()
{
    printf("P \t Q \t P⊕Q");
    printf("\n");
    int p,q,exclusiveor;
    for(p=0;p<=1;p++)
    {
        for(q=0;q<=1;q++)
        {
            if(p==1&&q==1 || p==0 && q==0)
                exclusiveor=0;
            else
                exclusiveor=1;
            printf("%d \t %d \t %d",p,q,exclusiveor);
            printf("\n");
        }
    }
    printf("Name: ASHESH NEUPANE \t Semester: SECOND \t Batch: 2080");
    return 0;
}
```

Output Screen:



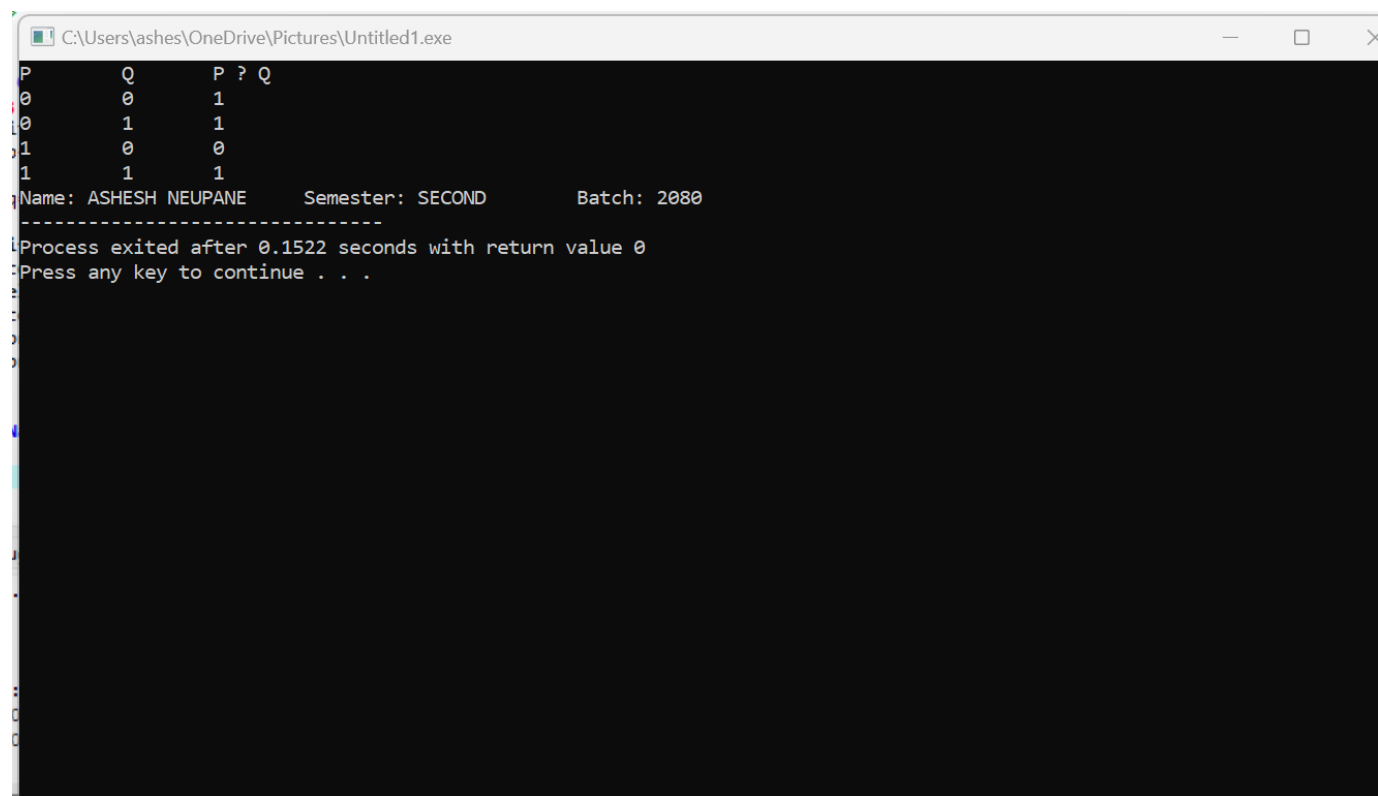
```
C:\Users\ashes\OneDrive\Pictures\Untitled1.exe
P      Q      P⊕Q
0      0      0
0      1      1
1      0      1
1      1      0
Name: ASHESH NEUPANE      Semester: SECOND      Batch: 2080
-----
Process exited after 0.1473 seconds with return value 0
Press any key to continue . . .
```

Write a program to print truth table of Conditional.

Source Code:

```
#include<stdio.h>
int main()
{
    printf("P \t Q \t P → Q ");
    printf("\n");
    int p,q,conditional;
    for(p=0;p<=1;p++)
    {
        for(q=0;q<=1;q++)
        {
            if(p==1 && q==0)
                conditional=0;
            else
                conditional=1;
            printf("%d \t %d \t %d",p,q,conditional);
            printf("\n");
        }
    }
    printf("Name: ASHESH NEUPANE \t Semester: SECOND \t Batch: 2080");
    return 0;
}
```

Output Screen:



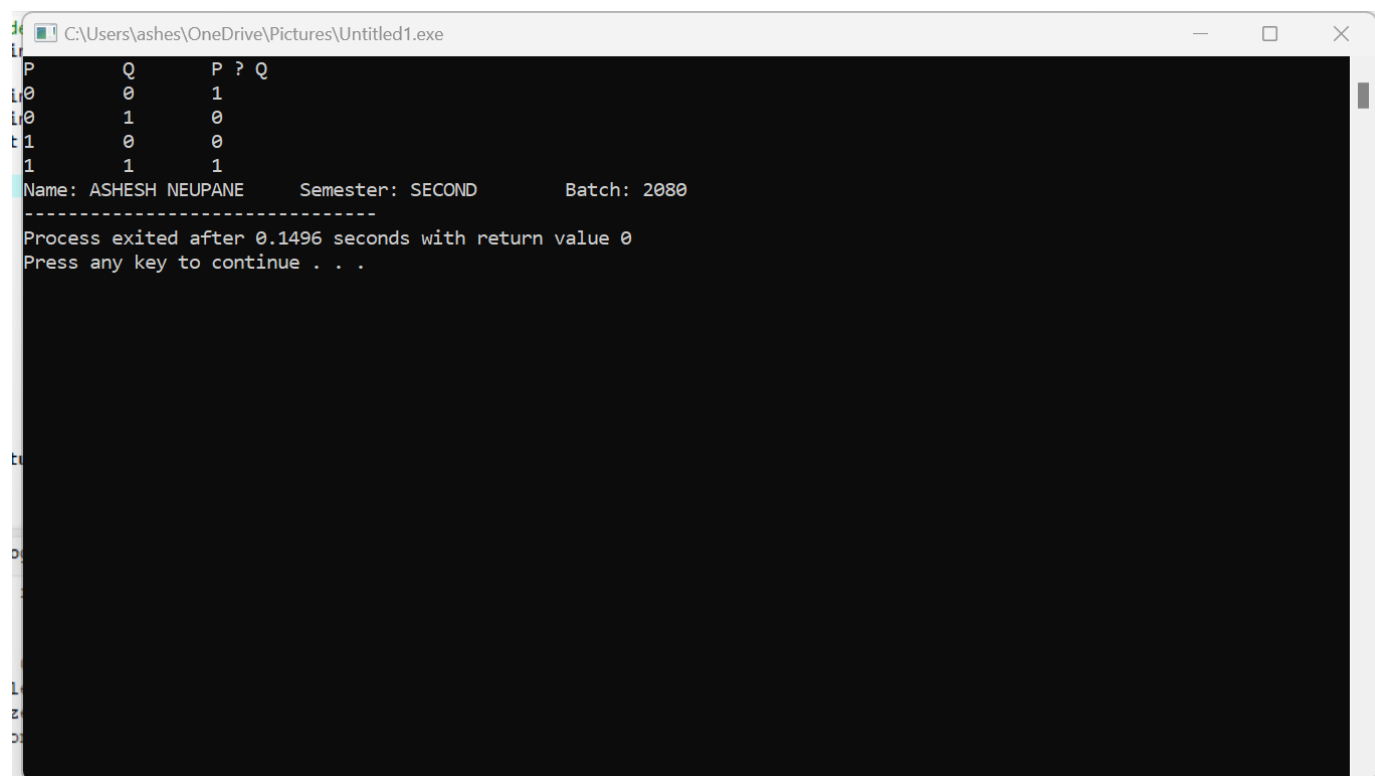
```
C:\Users\ashes\OneDrive\Pictures\Untitled1.exe
P      Q      P → Q
0      0      1
0      1      1
1      0      0
1      1      1
Name: ASHESH NEUPANE      Semester: SECOND      Batch: 2080
-----
Process exited after 0.1522 seconds with return value 0
Press any key to continue . . .
```

Write a program to print truth table of Bi - Conditional.

Source Code:

```
#include<stdio.h>
int main()
{
    printf("P \t Q \t P ↔ Q");
    printf("\n");
    int p,q,biconditional;
    for(p=0;p<=1;p++)
    {
        for(q=0;q<=1;q++)
        {
            if(p==1 && q==1 || p==0 && q==0)
                biconditional=1;
            else
                biconditional=0;
            printf("%d \t %d \t %d",p,q,biconditional);
            printf("\n");
        }
    }
    printf("Name: ASHESH NEUPANE \t Semester: SECOND \t Batch: 2080");
    return 0;
}
```

Output Screen:



```
P      Q      P ↔ Q
0      0      1
0      1      0
1      0      0
1      1      1
Name: ASHESH NEUPANE      Semester: SECOND      Batch: 2080
-----
Process exited after 0.1496 seconds with return value 0
Press any key to continue . . .
```

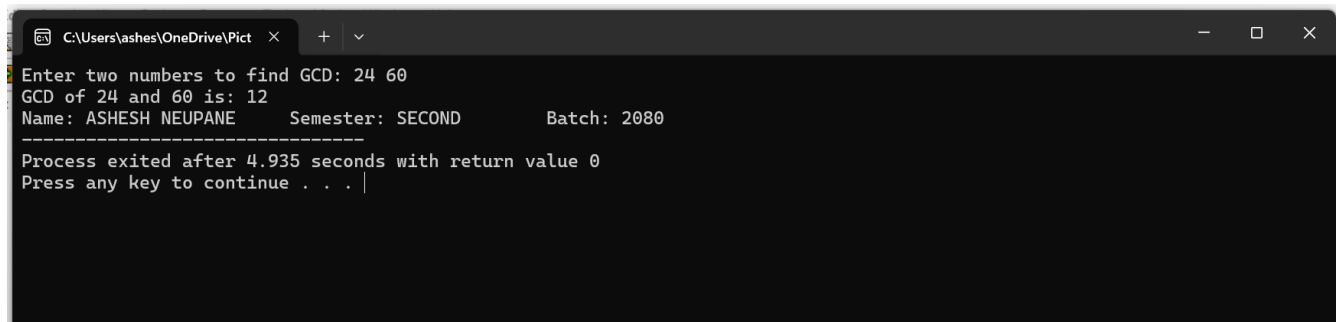

(LAB – 2 : Finding GCD by using Euclidian Algorithm)

Write a program to find GCD by using Euclidian Algorithm.

Source Code:

```
#include<stdio.h>
int GCD(int a,int b)
{
    while (b!=0)
    {
        int temp=b;
        b=a%b;
        a=temp;
    }
    return a;
}
int main()
{
    int num1, num2, gcd;
    printf("Enter two numbers to find GCD: ");
    scanf("%d %d",&num1,&num2);
    gcd = GCD(num1,num2);
    printf("GCD of %d and %d is: %d\n",num1,num2,gcd);
    printf("Name: ASHESH NEUPANE \t Semester: SECOND \t Batch: 2080");
    return 0;
}
```

Output Screen:



```
C:\Users\ashes\OneDrive\Pict  X + v
Enter two numbers to find GCD: 24 60
GCD of 24 and 60 is: 12
Name: ASHESH NEUPANE      Semester: SECOND      Batch: 2080
-----
Process exited after 4.935 seconds with return value 0
Press any key to continue . . . |
```

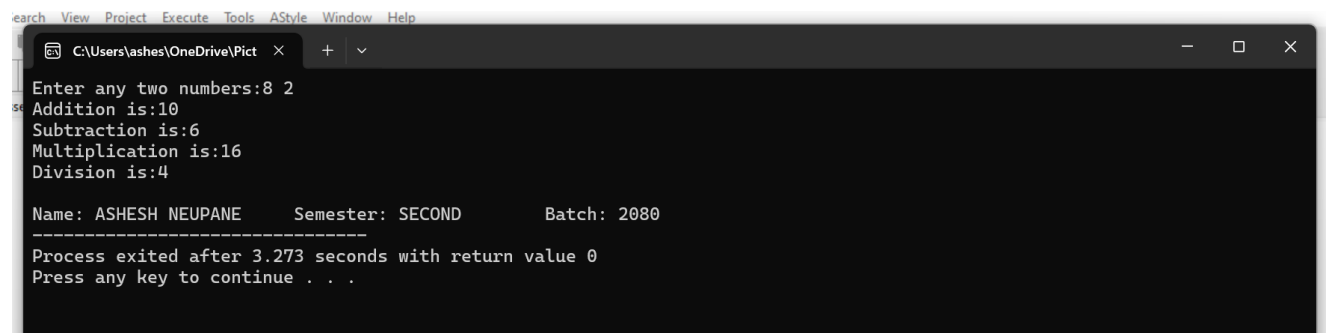
(LAB – 3)

Write a program to calculate addition, subtraction, multiplication and division of the two integer number.

Source Code:

```
#include<stdio.h>
int main()
{
    int a,b;
    printf("Enter any two numbers:");
    scanf("%d%d",&a,&b);
    printf("Addition is:%d\n",a+b);
    printf("Subtraction is:%d\n",a-b);
    printf("Multiplication is:%d\n",a*b);
    printf("Division is:%d\n",a/b);
    printf("\n");
    printf("Name: ASHESH NEUPANE \t Semester: SECOND \t Batch: 2080");
    return 0;
}
```

Output Screen:



```
search View Project Execute Tools AStyle Window Help
C:\Users\ashes\OneDrive\Pict x + v
Enter any two numbers:8 2
Addition is:10
Subtraction is:6
Multiplication is:16
Division is:4

Name: ASHESH NEUPANE      Semester: SECOND      Batch: 2080
-----
Process exited after 3.273 seconds with return value 0
Press any key to continue . . .
```

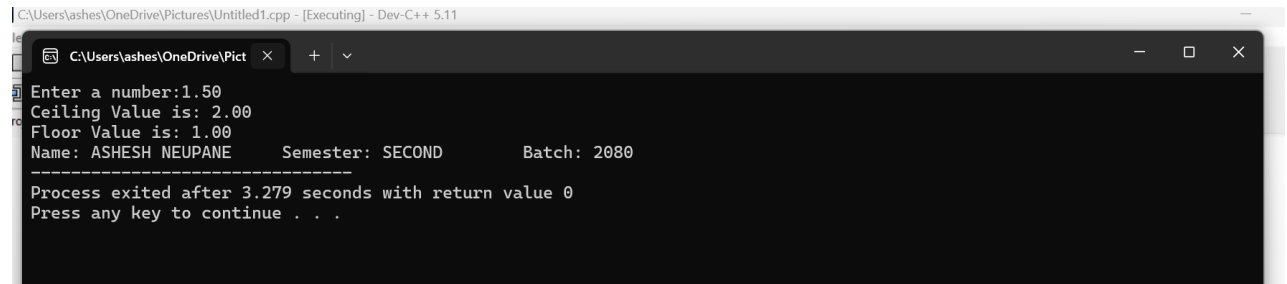
(LAB – 4)

Write a program to print the ceiling value and flooring value of the given number.

Source Code:

```
#include<stdio.h>
#include<math.h>
int main()
{
    float number;
    printf("Enter a number:");
    scanf("%f",&number);
    printf("Ceiling Value is: %.2f\n",ceil(number));
    printf("Floor Value is: %.2f\n",floor(number));
    printf("Name: ASHESH NEUPANE \t Semester: SECOND \t Batch: 2080");
    return 0;
}
```

Output Screen:



```
C:\Users\ashes\OneDrive\Pictures\Untitled1.cpp - [Executing] - Dev-C++ 5.11
Enter a number:1.50
Ceiling Value is: 2.00
Floor Value is: 1.00
Name: ASHESH NEUPANE      Semester: SECOND      Batch: 2080
-----
Process exited after 3.279 seconds with return value 0
Press any key to continue . . .
```

(LAB – 5)

Write a program to prove that $(p \rightarrow q) \wedge (p \rightarrow r) \rightarrow (p \rightarrow r)$ is tautology.

Source Code:

```
#include<stdio.h>
int main()
{
    int p,q,r,result1,result2,demo,result;
    printf("P \t Q \t R \t (P→Q)\t (P→R)\t (P→Q)^(P→R)→(P→R)");
    printf("\n");
    for(p=0;p<=1;p++)
    {
        for(q=0;q<=1;q++)
        {
            for(r=0;r<=1;r++)
            {
                if(p==1&&q==0)
                    result1=0;
                else
                    result1=1;
                if(p==1&&r==0)
                    result2=0;
                else
                    result2=1;
                if(result1==1&&result2==1)
                    demo=1;
                else
                    demo=0;
                if(demo==1&&result2==0)
                    result=0;
                else
                    result=1;
                printf("%d \t %d \t %d \t %d \t %d \t %d \n",p,q,r,result1,result2,result);
            }
        }
    }
    printf("Hence, Tautology Proved");
    printf("\nName: ASHESH NEUPANE \t Semester: SECOND \t Batch: 2080");
    return 0;
}
```

Output Screen:



```
Input
P      Q      R      (P→Q)  (P→R)  (P→Q)^(P→R)→(P→R)
0      0      0      1      1      1
0      0      1      1      1      1
0      1      0      1      1      1
0      1      1      1      1      1
1      0      0      0      0      1
1      0      1      0      1      1
1      1      0      1      0      1
1      1      1      1      1      1
Hence, Tautology Proved
Name: ASHESH NEUPANE      Semester: SECOND      Batch: 2080
...Program finished with exit code 0
Press ENTER to exit console.
```

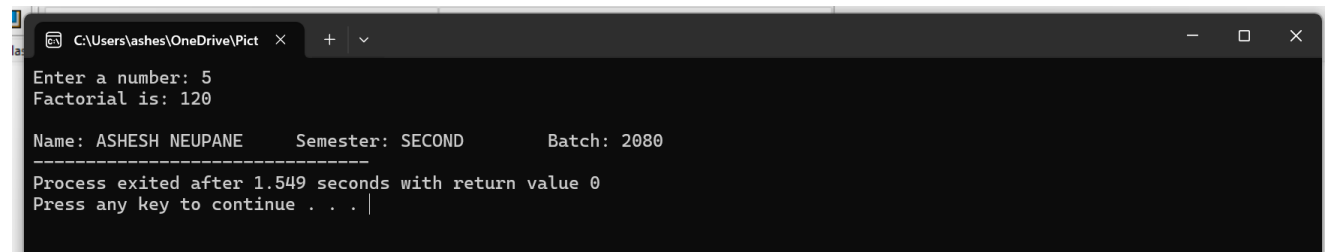
(LAB – 6)

Write a program to find the factorial of a given number using recursion.

Source Code:

```
#include<stdio.h>
int fact(int n);
int main()
{
    int n;
    printf("Enter a number: ");
    scanf("%d",&n);
    if (n < 0)
        printf("Factorial cannot be determined");
    else
        printf("Factorial is: %d\n", fact(n));
    printf("\nName: ASHESH NEUPANE \t Semester: SECOND \t Batch: 2080");
    return 0;
}
int fact(int n)
{
    if (n == 0)
        return 1;
    else
        return n * fact(n - 1);
}
```

Output Screen:



```
C:\Users\ashes\OneDrive\Pict  X  +  v
Enter a number: 5
Factorial is: 120

Name: ASHESH NEUPANE      Semester: SECOND      Batch: 2080
-----
Process exited after 1.549 seconds with return value 0
Press any key to continue . . . |
```

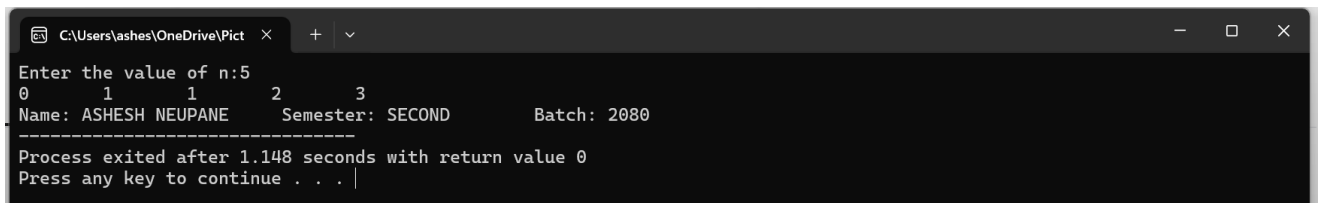
(LAB – 7)

Write a program to print Fibonacci series upto n using recursion.

Source Code:

```
#include<stdio.h>
int fibo(int n);
int main()
{
    int i,n;
    printf("Enter the value of n:");
    scanf("%d",&n);
    for(i=0;i<n;i++)
    {
        int r=fibo(i);
        printf("%d\t",r);
    }
    printf("\nName: ASHESH NEUPANE \t Semester: SECOND \t Batch: 2080");
}
int fibo(int n)
{
    if(n==0)
        return 0;
    else if(n==1)
        return 1;
    else
        return fibo(n-1)+fibo(n-2);
}
```

Output Screen:



```
C:\Users\ashes\OneDrive\Pict x + v
Enter the value of n:5
0      1      1      2      3
Name: ASHESH NEUPANE      Semester: SECOND      Batch: 2080
-----
Process exited after 1.148 seconds with return value 0
Press any key to continue . . . |
```

Write a program to print Fibonacci series upto n without using recursion.

Source Code:

```
#include<stdio.h>
int main()
{
    int n,first=0,second=1,next;
    printf("Enter the value of n: ");
    scanf("%d",&n);
    printf("Fibonacci series: ");
    for (int i = 0; i < n; i++)
    {
        if (i == 0)
            printf("%d ",first);
        else if (i == 1)
            printf("%d ", second);
        else
        {
            next=first+second;
            printf("%d ",next);
            first=second;
            second=next;
        }
    }
    printf("\nName: ASHESH NEUPANE \t Semester: SECOND \t Batch: 2080");
    return 0;
}
```

Output Screen:

A screenshot of a terminal window with a dark background. The window title bar shows the file path 'C:\Users\ashes\OneDrive\Pict' and standard window controls. The terminal output is as follows:
Enter the value of n: 10
Fibonacci series: 0 1 1 2 3 5 8 13 21 34
Name: ASHESH NEUPANE Semester: SECOND Batch: 2080

Process exited after 2.22 seconds with return value 0
Press any key to continue . . .

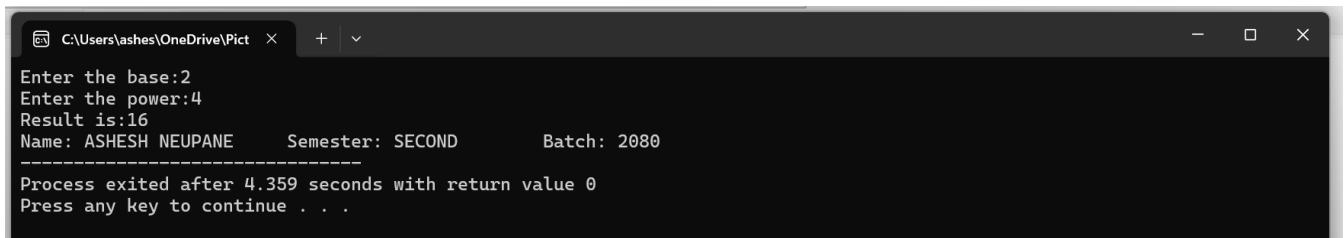
(LAB – 8)

Write a program to compute power of any number.

Source Code:

```
#include<stdio.h>
#include<math.h>
int main()
{
    int base,power,result;
    printf("Enter the base:");
    scanf("%d",&base);
    printf("Enter the power:");
    scanf("%d",&power);
    result=pow(base,power);
    printf("Result is:%d",result);
    printf("\nName: ASHESH NEUPANE \t Semester: SECOND \t Batch: 2080");
}
```

Output Screen:



```
C:\Users\ashes\OneDrive\Pict
Enter the base:2
Enter the power:4
Result is:16
Name: ASHESH NEUPANE      Semester: SECOND      Batch: 2080
-----
Process exited after 4.359 seconds with return value 0
Press any key to continue . . .
```

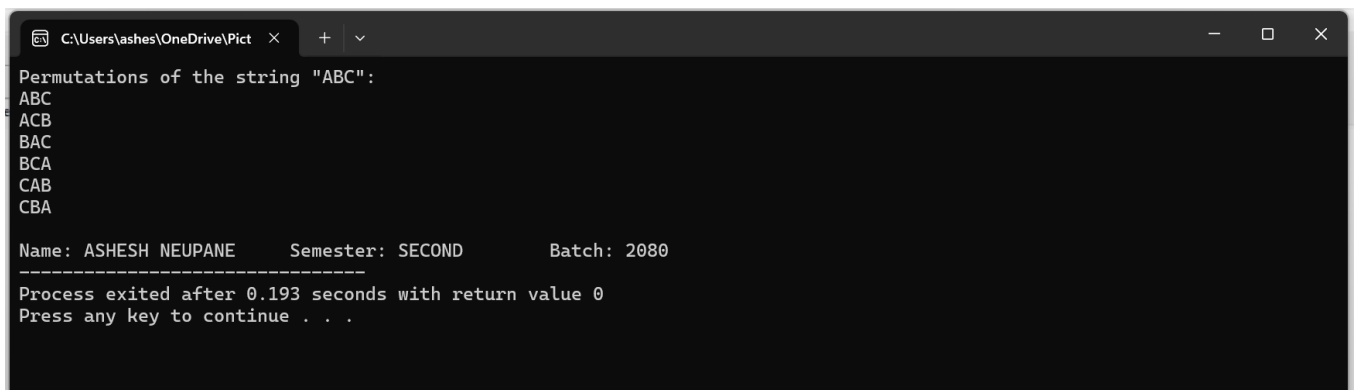

(LAB – 9)

Write a program to print the permuted string “ABC”.

Source Code:

```
#include <stdio.h>
int printPermutations(char *str, int length)
{
    char temp;
    for (int i = 0; i < length; i++)
    {
        for (int j = 0; j < length; j++)
        {
            for (int k = 0; k < length; k++)
            {
                if (i != j && i != k && j != k)
                    printf("%c%c%c\n", str[i], str[j], str[k]);
            }
        }
    }
    printf("\nName: ASHESH NEUPANE \t Semester: SECOND \t Batch: 2080");
}
int main()
{
    char str[] = "ABC";
    int length = sizeof(str) - 1;
    printf("Permutations of the string \"ABC\":\n");
    printPermutations(str, length);
    return 0;
}
```

Output Screen:



```
C:\Users\ashes\OneDrive\Pict
Permutations of the string "ABC":
ABC
ACB
BAC
BCA
CAB
CBA

Name: ASHESH NEUPANE      Semester: SECOND      Batch: 2080
-----
Process exited after 0.193 seconds with return value 0
Press any key to continue . . .
```