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Group A

Practical 3

1. Write a program to input two numbers and display the highest number.

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

int main()
{
   int x,y,high;
   printf("Enter two numbers : ");
   scanf("%d %d",&x,&y);
   if(x>y)
   printf("The highest number is %d",x);
   else
```

```
    printf("The highest number is %d",y);
    return 0;
}
```

2. Write a complete program to ask user enter three integer numbers, and then tell the user the largest value and smallest value among the three numbers.

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

int main()
{
    int n1,n2,n3,max,low;
    printf("Enter three numbers :");
    scanf("%d %d %d",&n1,&n2,&n3);
    max=n1;
    if(n2>max)
    max=n2;
    if(n3>max)
    max=n3;
    printf("the highest number is %d\n",max);
    low=n2;
    if(n1<low)
    low=n1;
```

```
    if(n3<low)
    low=n3;
    printf("The lowest number is %d",low);
    return 0;
}
```

3. Display employee name, new salary, when the user inputs employee name, and basic salary. You can refer following formula and the table to calculate new salary:

New Salary = Basic Salary + Increment

Basic Salary	Increment
Less than 5000	5% of Basic Salary
More than or equal 5000 and less than 10000	10% of Basic Salary
More than or equal 10,000	15% of Basic Salary

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

int main()
{
    char empname[20];
```

```
    float bs,inc,ns;

    printf("Enter Employee name");
    scanf("%s",&empname);
    printf("Enter Basic salary");
    scanf("%f",&bs);

    if (bs>=10000)
    inc=bs*0.15;
    else if (bs>=5000)
    inc=bs*0.10;
    else
    inc=bs*0.05;

    ns=bs+inc;
    printf("Employee Name %s\n",empname);
    printf("New Salary %.2f\n",ns);
    return 0;
}
```

4. Diameter, Circumference and Area of a Circle) Write a program that reads in the radius of a circle and prints the circle's diameter, circumference and area. Use the constant

value 3.14159 for π. Perform each of these calculations inside the printf statement(s) and use the conversion specifier %f.

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

int main()
{
   float radius;
   printf("Enter the Radius :");
   scanf("%f",& radius);

   printf("diameter is %.2f\n",radius*2.0);
   printf("circumference is %.2f\n",radius*2.0*3.14159);
   printf("area is %.2f\n",radius*radius*3.14159);
   return 0;
}
```

5. Write a program that reads in two integers and determines and prints if the first is a multiple of the second.

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

int main()
```

```
{
   int x,y;

   printf("Enter Two numbers");
   scanf("%d %d",&x,&y);

   if(x%y==0)
   printf("%d is a multiple of %d",x,y);
   else
   printf("%d is not a multiple of %d",x,y);
   return 0;
}
```

6. Write a C program that prints the integer equivalents of some uppercase letters, lowercase letters, digits and special symbols. As a minimum, determine the integer equivalents of the following: A B C a b c 0 1 2 $ * + / and the blank character.

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

int main()
{
   printf("A=%d\n",'A');
   printf("B=%d\n",'B');
```

```
    printf("C=%d\n",'C');
    printf("a=%d\n",'a');
    printf("b=%d\n",'b');
    printf("c=%d\n",'c');
    printf("0=%d\n",'0');
    printf("1=%d\n",'1');
    printf("2=%d\n",'2');
    printf("$=%d\n",'$');
    printf("*=%d\n",'*');
    printf("+=%d\n",'+');
    printf("/=%d\n",'/');
    printf(" =%d\n",' ');
    return 0;
}
```

7. The gross remuneration of a company salesman comprises the Basic Salary and certain additional allowances and bonuses as given below:

Salesmen with over 5 years' service receive a 10% additional allowance of Basic Salary each month.

Salesmen working in Colombo (Input character 'C' if the city is Colombo) receive an additional allowance of Rs. 2,500/- per month.

The monthly bonus payment is computed as given below:

Monthly Sales (Rs)	Bonus as a percentage of monthly sales
0-25000 25000-50000 >=50000	10 12 15

Write a program to output the gross monthly remuneration of a salesman.

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

int main()
{
   float basicSalary,monthlySales;
   int yearsOfService;
   char city;
   float additionalAllowance;
   float bonus;
   float grossRemuneration;

   printf("Enter the basic salary:");
   scanf("%f",&basicSalary);

   printf("Enter the number of years of service: ");
```

```
scanf("%d",&yearsOfService);

printf("Enter the city (Cfor Colombo,any other character for other cities): ");
scanf("%c",&city);

printf("Enter the monthly sales amount: ");
scanf("%f",&monthlySales);

if (yearsOfService>5){
   additionalAllowance = 0.1*basicSalary;
}

if(city=='C'){
   additionalAllowance =additionalAllowance+2500;
}

if(monthlySales >=0 &&monthlySales<=25000){
   bonus = 0.1*monthlySales;
}

else if(monthlySales>25000 && monthlySales <=50000){
   bonus=0.12*monthlySales;
}
```

```
    else if (monthlySales>50000){
        bonus=0.15*monthlySales;
    }

    grossRemuneration = basicSalary + additionalAllowance + bonus;

    printf("Gross Monthly Remuneration %.2f\n",grossRemuneration);
    return 0;
```

Practical 4

Q1) Use If-Else and write a program that reads an integer and determines and prints if the number is even or odd. (i.e. divisible by 2)

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

int main()
{
    int n;
    printf("Enter a number: ");
    scanf("%d",&n);
    if(n%2==0)
    printf("The %d is an even number",n);
    else
```

```
    printf("The %d is an odd number",n);
    return 0;
}
```

Re-write the above program using a switch statement instead of an If-Else statement!

```
 #include <stdlib.h>


int main()
{
    int n;
    printf("Enter a number: ");
    scanf("%d",&n);
    switch(n%2)
    {
        case 0:printf("%d is an even number",n);break;
        case 1:printf("%d is an odd number",n);break;
    }

    return 0;
}
```

Q2) Write a simple menu driven calculator to perform (+ - / *) operations. (The program must display a menu to select the desired operator.)

```
#include <stdlib.h>

int main()
{

   float n1, n2;
   char symbol[2];
   printf("\nEnter First Number: ");
   scanf("%f", &n1);
   printf("Select the Calculation Operator: \n");
   printf("+, -, /, * : \n");
   scanf("%s", symbol);
   printf("Enter Second Number: ");
   scanf("%f", &n2);
   switch (symbol[0])
   {
      case '+':
         printf("%.2f",n1+n2);
         break;
      case '-':
         printf("%.2f",n1-n2);
         break;
      case '*':
         printf("%.2f",n1*n2);
         break;
      case '/':
         printf("%.2f",n1/n2);
         break;
   }
```

```
    return 0;
}
```

Q3) Create a text-based, menu-driven program that allows the user to choose whether to calculate the circumference of a circle, the area of a circle or the volume of a sphere. The program should then input a radius from the user, perform the appropriate calculation and display the result.

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

int main()
{
   char d;
   printf("Enter 'c' for circumference|'a'for area|'v' for volume: ");
   scanf("%c",&d);

   float r;
   printf("Enter radius: ");
   scanf("%f",&r);

   switch(d){
      case'c':printf("Circumference: %.2f\n",2*3.14*r);break;
      case'a':printf("Area: %.2f\n",3.14*r*r);break;
      case'v':printf("Volume: %.2f\n",4/3*3.14*r*r*r);break;
```

```
        default:printf("Invalid choice\n");
    }



    return 0;
}
```

Q4) Write a C program to read a character from the user and determine whether the given letter is vowel or not. (Use a switch statement which also includes ‘default’ state).

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

int main()
{
    char vow;
    printf("Enter a letter :");
    scanf("%c",&vow);
    switch(vow)
    {
        case'a':printf("The entered letter is a vowel");break;
        case'e':printf("The entered letter is a vowel");break;
        case'i':printf("The entered letter is a vowel");break;
        case'o':printf("The entered letter is a vowel");break;
```

```
    case'u':printf("The entered letter is a vowel");break;
    default:printf("The entered letter is not a vowel");break;
  }

return 0;
}
```

Q5) Write a C program to enter month number and print total number of days in month using switch case. First assume that the given month belongs to a non-leap year.

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

int main()
{
  int mon;
  printf("Enter a month number :");
  scanf("%d",&mon);
  switch(mon)
  {
    case 1:printf("January  31 total days in the month ");break;
    case 2:printf("February \n 28 total days in the month ");break;
    case 3:printf("March \n 31 total days in the month ");break;
    case 4:printf("April\n 30 total days in the month ");break;
```

```
    case 5:printf("May\n 31 total days in the month ");break;
    case 6:printf("June\n 30 total days in the month ");break;
    case 7:printf("July\n 31 total days in the month ");break;
    case 8:printf("August\n 31 total days in the month ");break;
    case 9:printf("September\n 30 total days in the month ");break;
    case 10:printf("October\n 31 total days in the month ");break;
    case 11:printf("November\n 30 total days in the month ");break;
    case 12:printf("December\n 31 total days in the month ");break;
    default:printf("invalid");
  }


return 0;
}
```

Practical 5

❖ Section A

Q1) Write a C program to print numbers from 0 to 100. (You are required to write 3 separate answers each using While, Do..While, For, looping structures).

while

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

```
int main()
{
   int x=1;
   while(x<=100)
   {
      printf("%d ",x);
      x++;
   }
   return 0;
}
```

do while

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

int main()
{
   int x=1;
   do
   {
      printf("%d ",x);
      x++;
   }while(x<=100);
   return 0;
}
```

for

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

int main()
{
   int x=1;
```

```
    for(x=1;x<=100;x++)
    {
       printf("%d ",x);
    }
    return 0;
}
```

Q2) Write a C program to calculate and print the total of 10 marks and the average. If the average is less than 50 program should print “Fail!” otherwise “Pass!”

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

int main()
{
    int total=0,no[10],count;
    float ave;
    for(count=1;count<=10;count++)
    {
       printf("enter %d mark:",count);
       scanf("%d",&no[count]);
       total=total+no[count];
    }
    ave=(float)total/10.0;
    printf("The total of 10 marks is %d\n",total);
    printf("The average of 10 marks is %.2f\n",ave);

    if(ave<50)
    printf("Fail!");
    else
    printf("Pass!");
    return 0;
}
```

Q3) Write a C program to calculate factorial of a user given number.

Hint:

- ✓ **Select an appropriate looping structure.**
- ✓ **Factorial of '0' is '1' (0! = 1)**
- ✓ **Ex: factorial of number 5 is calculated as 5! = 5*4*3*2*1**

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

int main()
{
   int i,num,fact=1;
   printf("Enter num:");
   scanf("%d",&num);
   i=num;

   for(i;i>=1;i--)
   {
      printf("%d",i);
      fact+fact*i;
   }

   printf("Factional of given number is %d",fact);
   return 0;
}
```

Q4) Write a C program to calculate the sum of all digits of a user given number.

- **If user input 123 your program should output 6. (calculated as 1+2+3)**

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

int main()
{
  int num;
  printf("Enter the number:");
  scanf("%d",&num);
  int sum = 0;
  int remainder;
  while (num > 0)
 {
    remainder = num % 10;
    sum += remainder;
    num = num / 10;
  }
  printf("The sum of all digits of the given number =%d",sum);
   return 0;
}
```

Q5) Write a C program to reverse the digits of a number using do-while statement.

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

int main()
{
  int n1,n2;
  printf("Enter the number:");
  scanf("%d",&n1);

  do
  {
```

```
    n2=n1%10;
    printf("%d ",n2);
    n1=n1/10;
  }while(n1!=0);
   return 0;
}
```

Q6) Write a C program to calculate nth power of a given integer. The user input base and exponent. (Do NOT use inbuilt functions, instead use a loop)

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

int main()
{
  int n,x,cal=1,count;
  printf("Enter the base :");
  scanf("%d",&x);
  printf("Enter the exponent :");
  scanf("%d",&n);

  for(count=1;count<=n;count++)
  {
    cal=cal*x;
  }
  printf("%dth power of the given base is : %d",n,cal);
   return 0;
}
```

Q7) Write a C program to print first 10 numbers of “Fibonacci Sequence”.

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

```
#include <stdlib.h>

int main()
{
  int num=10;
  int first=0,second=1;
  int next;
  printf("Fibonacci Sequence:");
  for(int x=0;x<=num;x++)
  {
     if(x<=1)
     {
        next=x;
     }
     else
     {
        next=first+second;
        first=second;
        second=next;
     }
     printf("%d ",next);
  }
  printf("\num");

   return 0;
}
```

Q8) Write a C program to check whether a given number is an Armstrong Number! (Refer to previous flowcharts)

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

int main()
```

```
{
    int x1,x,sum=0,cal,n,count=1,mod;
    printf("Enter a number :");
    scanf("%d",&x);
    x1=x;
    n=x;
    while(n!=0)
    {
      n=n/10;
      count++;

    }
    printf("%d",--count);

    while(x!=0)
    {
      mod=x%10;
      cal=pow(mod,count);
      sum=sum+cal;
      x=x/10;
    }
    printf("\n");
    if(x1==sum)
    printf("The given number is an armstrong number ");
    else
    printf("The given number is not an armstrong number");

   return 0;
}
```

Q9) Write a C program to print all the ASCII values for letters A to Z.

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

```
#include <stdlib.h>

int main()
{
  char letter;
  printf("ASCII values for letters A to Z :\n");
  for(letter='A';letter<='Z';letter++)
  {
     printf("%c:%d\n",letter,letter);
  }
  return 0;
}
```

Q10) Write a program to print this pattern.

```
*

**

***

****

*****
```

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

int main()
{
  int rows=5;
  printf("Pattern:\n");
  for(int x=1;x<=rows;x++)
  {
     for(int y=1;y<=x;y++)
     {
```

```
            printf("*");
        }
        printf("\n");
    }
    return 0;
}
```

Q11) Write a program to check whether a given number is prime or not.

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

int main()
{
  {int num,pnum;
  printf("Enter a number");
  scanf("%d",&num);
  if(pnum==1)
  {
     printf("%d is a prime number\n",num);
  }
  else
  {
     printf("%d is not a prime number\n",num);
  }
  return 0;
  }
  int num;
  if(num<=1)
  {
     return 0;
  }
  for(int i=2;i<=num/2;i++)
```

```
  {
    if(num%i==0)
    {
      return 0;
    }
    return 1;
  }
}
```

Q12) Write a C program to print all factors of a given integer.

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

int main()
{
  int num;
  printf("Enter an integer");
  scanf("%d",&num);
  printf("Factors are %d",num);
  for(int i=1;i<=num;i++)
  {
    if(num%i==0)
    {
      printf("%d",i);
    }
  }
  printf("\n");
  return 0;
}
```

Q12) Write a C program to add all user inputs until user input ‘-1’. And then display the sum.

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

```
#include <stdlib.h>

int main()
{
  int num,sum=0;
  printf("Enter the numbers(to stop enter-1)\n");
  while(1)
  {
     scanf("%d",&num);
     if(num==-1)
     {
        break;
     }
     sum+=num;
  }
  printf("Sum %d\n",sum);
  return 0;
}
```

Q13) Write a C program to read user inputs for an integer array (size = 10) and print the array.

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

int main()
{
  int num[10];
  printf("Enter 10 numbers:\n");

  for (int i=0;i<10;i++)
  {
    scanf("%d",&num[i]);
  }
```

```
  printf("Entered numbers:\n");

  for (int i=0;i<10;i++)
  {
     printf("%d ", num[i]);
  }
 printf("\n");
  return 0;
}
```

Q14) Re-Write the above code to count all the even numbers in above integer array and display the count.

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

int main()
{
  int num[10];
  int evenCount=0;
  printf("Enter 10 numbers:\n");
  for (int i=0;i<10;i++)
  {
     scanf("%d", &num[i]);
     if (num[i]%2==0)
     {
        evenCount++;
     }
  }
 printf("Number of even numbers: %d\n", evenCount);
  return 0;
}
```

❖ Section B

1. Input 10 numbers and to output number of positive, number of negative, number of zeros.

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

int main()
{
   int num[10];
   int posCount=0, negCount=0, zeroCount=0;

   printf("Enter 10 numbers:\n");

   for (int i=0;i<10;i++)
   {
     scanf("%d",&num[i]);
     if (num[i] >0)
     {
       posCount++;
     }
     else if (num[i]<0)
     {
        negCount++;
     }
     else
     {
       zeroCount++;
     }
   }

   printf("Positive numbers: %d\n", posCount);
   printf("Negative numbers: %d\n", negCount);
   printf("Zeroes: %d\n", zeroCount);
```

```
  return 0;
}
```

2. Input Marks of 10 students and output the maximum , minimum and average Marks.

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

int main()
{
   int marks[10];
   int sum = 0;
   int max,min;
   printf("Enter marks of 10 students:\n");

   for (int i=0; i<10;i++)
   {
    scanf("%d",&marks[i]);
    sum += marks[i];
    if (i==0)
    {
      max= marks[i];
      min= marks[i];
    }
    else
    {
       if (marks[i] > max)
       {
          max=marks[i];
       }
       if (marks[i] < min)
       {
```

```
            min=marks[i];
          }
        }
      }
      double average = (double)sum/10;

      printf("Maximum marks: %d\n", max);
      printf("Minimum marks: %d\n", min);
      printf("Average marks: %.2f\n", average);
     return 0;
}
```

3. Input price of 10 items and display the average value of an Item , number of items which the price is greater than 200.

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

int main()
{
   double prices[10];
   double sum = 0;
   int countGreaterThan200 = 0;
   printf("Enter the price of 10 items:\n");

   for (int i=0;i<10;i++)
   {
      scanf("%lf", &prices[i]);
      sum += prices[i];

      if (prices[i] > 200)
      {
        countGreaterThan200++;
      }
```

```
    }
    double average = sum / 10;
    printf("Average price: %.2lf\n", average);

   return 0;
}
```

4. Input the Employee no and the Basic Salary of the Employees in an organisation ending with the dummy value -999 for Employee no and count the number Employees whose Basic Salary >=5000.

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

int main()
{
     int employeeNo;
     float basicSalary;
     int count = 0;
     printf("Enter the employee number and basic salary (-999 to end):\n");
     while (1) {
     printf("Employee No: ");
     scanf("%d", &employeeNo);
     if (employeeNo == -999)
     break;
     printf("Basic Salary: ");
     scanf("%f", &basicSalary);
     if (basicSalary >= 5000)
     count++;
     }
     printf("Number of employees with basic salary >= $5000: %d\n", count);

    return 0;
```

```
}
```

5. Input employee number, and hours worked by employees, and to display the following:

Employee number, Over Time Payment, and the percentage of employees whose Over Time Payment exceeding the Rs. 4000/-.

The user should input –999 as employee number to end the program, and the normal Over Time Rate is Rs.150 per hour and Rs. 200 per hour for hours in excess of 40

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

int main()
{
        int empno=0, count1 = 0, count2 = 0;
    float ot=0, hours = 0,percen;

    while (1) {
    printf("Employee No: ");
    scanf("%d", &empno);
    if (empno == -999) {
    break;
    }
    count1++;
    printf("No of hours worked: ");
    scanf("%f", &hours);
    if (hours <= 40) {
    ot = hours * 150;
    } else {
    ot = hours * 200;
```

```
    }
    printf("Empolyee No: %d\n", empno);
    printf("Overtime Payment: %.2f\n", ot);
    if (ot >= 4000){
    count2++;
    }
    }
    percen = (float)(count2 / count1)*100;
    printf("Percentage: %.2f%%", percen);

  return 0;
}
```