Week 1

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C Programs

Q. WAP to perform arithmetic and relational operations on 2 numbers.

Sol:-

```
#include<stdio.h>
int main()
{
  int t=1;
  int num1, num2, power;
  printf("Enter 2 numbers : ");
  scanf("%d %d", &num1, &num2);
  printf("Choose from the options: \n");
  while(t!=0)
  {
    int i;
    printf("1.addition\n2.subtraction\n3.multiplication\n4.division
          \n5.greater than\n6.lesser than\n7.equal to\n8.greater than
          equal to\n9.%remainder\n10.exponent\n-1.exit\n\n");
    scanf("%d", &i);
    if(i==1)
    {
      printf("sum = %d\n\n", num1+num2);
    }
    else if(i==2)
    {
      printf("difference = %d\n\n", num1-num2);
    }
    else if(i==3)
    {
      printf("product = %d\n\n", num1*num2);
    }
    else if(i==4)
    {
      printf("quotient = %d\n\n", num1/num2);
    }
```

```
else if (i==5)
{
  if (num1 > num2)
      printf("%d is greater than %d", num1, num2);
  else
      printf("%d is greater than %d \n\n", num2, num1);
}
else if (i==6)
{
   if (num1 < num2)
    printf("%d is lesser than %d \n\n", num1, num2);
   else
    printf("%d is lesser than %d \n\n", num2, num1);
}
else if (i==7)
{
   if (num1 == num2)
    printf("%d is equal to %d \n\n", num1, num2);
   else
    printf("%d is not equal to %d \n\n", num1, num2);
}
else if (i==8)
{
   if (num1 >= num2)
    printf("%d is greater than equal to %d \n\n", num1, num2);
   else
    printf("%d is greater than equal to %d \n\n", num2, num1);
}
else if (i==9)
{
  printf("remainder = %d \n", num1 % num2);
}
```

```
else if (i==10)
{
  for(int i=0; i<num2; i++)
  {
    power = num1*i;
  }
} printf("%d to the power of %d = %d \n\n", num1, num2, power);

else if (i==-1)
{
 printf("\n Thank You");
 A=0;
}

else
{
  printf("\n Wrong Input \n\n");
}

return 0;
}
```

Q. WAP to take 3 numbers as inputs and find the largest no and the second largest no, find out the average of the largest two numbers and print all the even numbers b/w largest no and the second largest no.

Sol:-

```
#include <stdio.h>
float sumaver (int a, int b)
{
   int sum, aver;
   sum = a+b;
   printf("\n sum of the largest two numbers = %d", sum);
   aver = sum/2;
   return aver;
}

int printeven (int a, int b)
{
  Printf("\n all even no b/w largest and second
          largest numbers are :\n");
  for(int i=a; i<=b; i++)
  {
     if( i % 2 == 0)
     {
        printf("%d \t", i);
     }
  }
}
```

```
int main()
{
  int num1, num2, num3, lar1, lar2;
  float average;
  printf("enter 3 numbers :\n");
  scanf("%d %d %d", &num1, &num2, &num3);
  if((num1>num2)&&(num1>num3))
  {
     lar1 = num1;
     if(num2>num3)
      {
        lar2 = num2;
      }
     else
      {
        lar2 = num3;
      }
  }
else if((num2>num1)&&(num2>num3))
  {
     lar1 = num2;
     if(num1>num3)
      {
        lar2 = num1;
      }
     else
      {
        lar2 = num3;
      }
}
```

```
else
  {
     lar1 = num3;
     if(num1 > num2)
     {
        lar2 = num1;
     }
     else
     {
        lar2 = num2;
     }
  }
printf("the largest number = %d \n", lar1);
printf("the second largest number = %d", lar2);
average = sumaver(lar1, lar2);
printf("\n average of the largest two numbers = %f", average);
printeven(lar2, lar1);
return 0;
}
```

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Week 2

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Pro.

1. Write a Java program to print "Hello World".

Sol:-

```
class HelloWorld
{
  public static void main (String args[])
  {
    System.out.println("Hello World");
  }
}
```

2. Write a Java program to find largest of 3 numbers using if construct

Sol:-

```
import java.util.Scanner;
class largest
{
  public static void main (String args[])
  {
    int num1, num2, num3;
    Scanner in = new Scanner (System.in);
    System.out.print("Enter first number : ");
    num1 = in.nextInt();
    System.out.print("Enter second number : ");
    num2 = in.nextInt();
    System.out.print("Enter third number : ");
    num3 = in.nextInt();

    if (num1 > num2 && num1 > num3)
    {
      System.out.println("largest number = "+num1);
    }
```

```
else if (num2>num1 && num2>num3)
 {
  System.out.println("largest number - " +num2);
 }
 else
 {
  System.out.println("largest number - " +num3);
 }
}
}
```

3. Write a Java program to print values from 1 to n by taking input from the user.

Sol:-

```
import java.util.Scanner;
class ForLoop
{
 public static void main(String args[])
 {
  int n;
  System.out.print("Enter value of n - ");
  Scanner in = new Scanner(System.in);
  n = in.nextInt();
  System.out.println("result - ");
  for(int i=1; i<=n; i++)
  {
   System.out.println(i);
  }
 }
}
```

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4. Write a Java program to accept a number n from the user and print n rows of output as as given below if n = 4

```
1
2 3
4 5 6
7 8 9 10
```

56.-

```
import java.util.Scanner;
class NumPattern
{
 public static void main (String args[])
  {
   int rows, K = 1;
   System.out.print("Enter no. of rows : ");
   Scanner in = new Scanner(System.in);
   rows = in.nextInt();
   System.out.println("Pattern - ");
   for(int i = 0; i <= rows; i++)
   {
     for (int j = 1; j <= i; j++)
      {
        System.out.print( K++ + " ");
      }
     System.out.println();
   }
  }
}
```

5. Write a Java program to accept the CIE marks (out of 50) and SEE marks (out of 100) of a student and print his/her grade. Use if elseif ladder

Sol:-

```
import java.util.Scanner;
class Grade
{
  public static void main(String args[])
  {
    float cie, see, final_marks;
    char grade;
    Scanner in = new Scanner(System.in);
    System.out.print("Enter CIE marks (out of 50) : ");
    cie.in = nextDouble();
    System.out.print("Enter SEE marks (out of 100) : ");
    see.in = nextDouble();
    final_marks = cie + (see/2);
    if(final_marks>90 && final_marks<=100)
    {
      System.out.println("Grade - S");
    }
  else if(final_marks>80 && final_marks<=90)
    {
    System.out.println("Grade - A");
    }
  else if(final_marks>70 && final_marks<=80)
    {
    System.out.println("Grade - B");
    }
  else if(final_marks>60 && final_marks<=70)
    {
    System.out.println("Grade - C");
    }
```

```
else if (final_marks>50 && final_marks<=60)
{
  System.out.println("Grade - D");
}
else if (final_marks>40 && final_marks<=50)
{
  System.out.println("Grade - E");
}
else if (final_marks>=30 && final_marks<=40)
{
  System.out.println("Grade - F");
}
else
{
  System.out.println("Wrong Input");
}
}
}
```

6. Write a C/Java program to print the prime numbers given two integers (inclusive). Accept these two integers from the user.

Sol:-

```
import java.util.Scanner;
class Prime
{
  public static void main(String args[])
  {
    int num1,num2;
    Scanner in = new Scanner(System.in);
    System.out.print("Enter first number : ");
    num1 = in.nextInt();
```

```
System.out.print("Enter second number : ");
num2 = in.nextInt();
System.out.println("Prime numbers b/w the two numbers :");
while (num1 < num2)
{
   boolean flag = false;
   for (int i = 2; i <= num1/2 ; ++i)
   {
      if (num1 % i == 0)
      {
         flag = true;
         break;
      }
   }
   if ( !flag && num1 != 0 && num1 != 1)
   {
      System.out.print(num1 + " ");
   }
   ++num1;
}
}
}
```

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Lab 1

Q. Develop a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read in a, b, c and use quadratic formula. If discriminant $b^2 - 4ac$ is negative, display a message stating that there are no real solutions.

Sol:-

```
import java.util.Scanner;
class quadratic
{
  public static void main(String args[])
  {
    double a, b, c, D, root1, root2;
    Scanner in = new Scanner(System.in);
    System.out.print("Enter coefficient of x squared: ");
    a = in.nextDouble;
    System.out.print("Enter coefficient of x: ");
    b = in.nextDouble;
    System.out.print("Enter constant: ");
    c = in.nextDouble;
    D = (b*b) - (4*a*c);
    root1 = -b + Math.sqrt(D) / (2*a);
    root2 = -b - Math.sqrt(D) / (2*a);
    if (D > 0)
    {
      System.out.println("roots are -" + root1 + " " + root2);
      System.out.println("They are real and distinct");
    }
    else if (D == 0)
    {
      System.out.println("roots are -" + root1 + " " + root2);
      System.out.println("They are real and equal");
    }
```

```
        else
        {
            System.out.println("the roots are imaginary");
        }
    }
}
```

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Lab 2

Q Develop a java program to create a class Student with members usn, name, an array credits and an array marks. Include methods to accept and display details and a method to calculate SGPA of a student.

Sol:-

```
import java.util.Scanner;

class Student
{
  private String usn, name;
  private int n, credits[], totalcredits = 0;
  private double marks[], SGPA = 0;
  Scanner in = new Scanner(System.in);

  void Details()
  {
    System.out.println("Enter the usn - ");
    usn = in.nextLine();
    System.out.println("Enter the student name - ");
    name = in.nextLine();
    System.out.println("Enter the no. of subjects - ");
    n = in.nextInt();
    credits = new int[n];
    marks = new double[n];
    for(int i=0; i<n; i++)
    {
      System.out.println("Subject " + (i+1));
      System.out.println("Enter allotted credits - ");
      credits[i] = in.nextInt();
      System.out.println("Enter marks - ");
      marks[i] = in.nextDouble();
      Calculate(credits[i], marks[i], i);
    }
  }
}
```

```
void Calculate(int credits, double mark, int j)
{
    totalCredits += credit;
    if(marks >= 90 && mark <= 100)
    {
        SGPA += (10 * credit);
    }
    else if(mark >= 80 && mark <= 89)
        SGPA += (9 * credit);
    else if(mark > 70 && mark <= 79)
        SGPA += (8 * credit);
    else if(mark > 60 && mark <= 69)
        SGPA += (7 * credit);
    else if(mark > 50 && mark <= 59)
        SGPA += (6 * credit);
    else if(mark > 40 && mark <= 49)
        SGPA += (5 * credit);
    else
        System.out.println("Failed in subject " + (j+1));
}

void Display()
{
    System.out.println("Details of the student - ");
    System.out.println("USN : " + usn);
    System.out.println("Name : " + name);
    System.out.println("SGPA : " + (SGPA / totalCredits));
}
}
```

```
class Stu_Info
{

public static void main ( String args[ ])
  {

    Student stu = new Student ( );
    stu.Details ( );
    stu. Display ( );
  }
}
```

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Lab 3

Q. Create a class Book which contains 4 members: name, author, price, num_pages. Include constructor to set the values for members. Include methods to set and get details of objects. Include toString() method that could display complete details of the book. Develop a Java prog to create n book objects.

Sol:-

```
import java.util.Scanner;

class Book
{
  private String name, author;
  private double price;
  private int num_pages;
   Book()
   {
     name = "The Shining";
     author = "Stephen King";
     price = 399.00;
     num_pages = 500;
   }

  void getDetails()
   {
     Scanner in = new Scanner(System.in);
     System.out.println("\n Enter book name: ");
     name = in.nextLine();
     System.out.println("Enter author name: ");
     author = in.nextLine();
     System.out.println("Enter no. of pages: ");
     num_pages: in.nextInt();
     System.out.println("Enter the price: ");
     price = in.nextDouble();
  }
```

```
public String toString()
{
String temp: "Book name:" +name+ "\nAuthor name: "+auth
        +"\nno.of pages: "+num_pages+"\nPrice:"
        +price+"\n";
  return (temp);
 }
}
```

```
class BOOK_details
{
 public static void main (String args[])
 {
   int i, n;
   Scanner in = new Scanner (System.in);
   System.out.print ("Enter no.of books : ");
   n = in.nextInt();
   Book[] obj = new Book[n];
   for(i=0; i<n; i++)
   {
       obj[i] = new Book();
   }
  System.out.println("** ENTER BOOK DETAILS **");
  for(i=0; i<n; i++)
  {
     System.out.println("\nBook"+(i+1)+":");
     obj[i].getDetails();
  }
  System.out.println("** Book Details **");
  for(i=0; i<n; i++)
   {
       System.out.println(obj[i]);
   }
 }
}
```

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Lab 4

Q. Create abstract class Shape that contains 2 int and an empty method named printArea(). Provide 3 classes named Rectangle, Triangle and Circle such that each one of the classes extends class Shape. Each one of the classes contain only the method printArea() that prints area of given shape

Sol:-

```
import java.util.Scanner;

abstract class Shape
{
    int a, b;
    abstract void printArea();
}

class Rectangle extends Shape
{
    void printArea()
    {
        System.out.println("Area of rectangle = "+(a*b));
    }
}

class Triangle extends Shape
{
    void printArea()
    {
        System.out.println("Area of triangle = " + (0.5*a*b));
    }
}

class Circle extends Shape
{
    void printArea()
    {
```

```
    System.out.println("Area of circle = "+(3.142*a*a));
  }
}

class Shapemain
{
  public static void main (String args[])
  {
    Scanner in = new Scanner (System.in);
    Rectangle r = new Rectangle ();
    Triangle t = new Triangle ();
    Circle c = new Circle ();

    System.out.println("Enter length and breadth : ");
    r.a = in.nextInt ();
    r.b = in.nextInt ();
    r.printArea ();

    System.out.println("Enter height and base : ");
    t.a = in.nextInt ();
    t.b = in.nextInt ();
    t.printArea ();

    System.out.println("Enter radius : ");
    c.a = in.nextInt ();
    c.printArea ();
  }
}
```

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Lab 5

Q Create a class Bank that maintains 2 kinds of account for its customers, savings account and the other current account. ~~savings account~~.

Sol:-

```
import java.util.Scanner;

class account
{
    private String name;
    private long account_number;
    private int account_type;
    double balance;

    void get_data()
    {
        Scanner ss = new Scanner(System.in);
        System.out.println("enter your name");
        name = ss.next();
        System.out.println("enter the account number");
        account_number = ss.nextLong();
        System.out.println("choose account type \n 1. savings\n
                            2. current");
        account_type = ss.nextInt();
    }

    int return_account_type()
    {
        return account_type;
    }
}
```

```
class savings extends account
{
  Scanner ss = new Scanner(System.in);
  double amount;

  void get_sav_balance()
  {
   System.out.println("enter the amount to be placed in your
                       savings account");
   amount = ss.nextDouble();
   balance += amount;
  }

  void display_sav_blnce()
  {
   System.out.println("balance = " + balance);
  }

  void compute_sav_interest()
  {
   System.out.println("interest of 5% shall be added to your
                       balance");
   balance += (0.5 * balance);
  }

  void withdrawal_sav()
  {
   System.out.println("enter amount to be withdrawn");
   amount = ss.nextDouble();
   balance -= amount;
  }

}
```

```
class current extends account
{
 Scanner ss = new Scanner (System.in);
 double amount;
 final double min-balance = 5000;

 void get-cur-balance()
 {
  System.out.println("enter amount to be placed in your current
                      account");
  amount = ss.nextDouble();
  balance += amount;
 }

 void display-cur-blnce()
 {
  System.out.println("balance =" + balance);
 }

void compute-cur-service-charges()
 {
  if (balance < min-balance)
  {
  System.out.println("service tax of rs.500 shall be levied");
  balance -= 500;
  }
  else
  {
  System.out.println("minimum balance is maintained");
  }
}
```

```
void withdrawal_cur()
{
  System.out.println("enter amount to be withdrawn");
  amount = sc.nextDouble();
  balance -= amount;
}
}

class bankmain
{
 public static void main(String args[])
 {
  System.out.println("enter the bank details");
  account acc = new account();
  acc.get_data();
  int type = acc.return_account_type();
  if (type == 1)
  {
   System.out.println("SAVINGS ACCOUNT");
   savings sav = new savings();
   sav.get_sav_balance();
   sav.display_sav_blnce();
   sav.compute_sav_interest();
   sav.display_sav_blnce();
   sav.withdrawal_sav();
   sav.display_sav_blnce();
  }
  if (type == 2)
  {
   System.out.println("CURRENT ACCOUNT");
   current cur = new current();
   cur.get_cur_balance();
```

```
            cur.display_cur_blnce();
            cur.compute_cur_service_charges();
            cur.display_cur_blnce();
            cur.withdraw_cur();
            cur.display_cur_blnce();
        }
    }
}
```