Programming Questions and Solutions in Java (15CS561)

1. **Write a program to find area of circle.**

```
class Circle
{
	public static void main(String args[])
	{
		int r=3;
		float PI=3.1416f, area;

		area=PI*r*r;
		System.out.println("Area is "+area);
	}
}
```

2. **Find simple interest and compound interest. Given Principal, rate of interest and time in years.**

```
class SICI
{
	public static void main(String args[])
	{
		int p=10000,t=3;
		double r=5.5, SI,CI;

		SI=p*t*r/100;
		CI=p*Math.pow(1+r/100,t)-p;
		System.out.println("Simple Interest= "+ SI);
		System.out.println("Compound Interest= "+ CI);
	}
}
```

3. **Check whether given number is even or odd using bitwise operators.**

```
class EvenOdd
{
	public static void main(String args[])
	{
		int n=53, result;

		result = n&1;
		if (result==0)
			System.out.println("n is even");
		else
			System.out.println("n is odd");
	}
}
```

4. Find biggest among 3 numbers using ternary operator.

```
class Biggest
{
     public static void main(String args[])
     {
          int a=13,b=25,c=7, big;

          big=(a>b?(a>c?a:c):(b>c?b:c));
          System.out.println("Biggest is " + big);
     }
}
```

5. Find area of triangle given 3 sides. Check whether triangle can be formed or not.

```
class Triangle
{       public static void main(String args[])
        {
             int a=3,b=5,c=4;
             double s, area;

             if (a+b<c || a+c<b || b+c<a)
                System.out.println("Triangle cannot be formed");
             else
             {
                  s=(a+b+c)/2.0;
                  area=Math.sqrt(s*(s-a)*(s-b)*(s-c));
                  System.out.println("Area is " + area);
             }
        }
}
```

6. Find sum of digits of a given number.

```
class SumDigits
{       public static void main(String args[])
        {
             int n=12345, sum=0, num, d;

             num=n;
             while(num!=0)
             {
                  d=num%10;
                  sum+=d;
                  num=num/10;
             }

             System.out.println("Sum of digits = " + sum);
        }
}
```

7. Reverse a number and check for palindrome.

```
class Palindrome
{
     public static void main(String args[])
     {
          int n=12321,  num,revnum=0, d;

          num=n;
          while(num!=0)
          {
               d=num%10;
               revnum = revnum*10+d;
               num=num/10;
          }
          System.out.println("Reverse is = " + revnum);
          if(n==revnum)
               System.out.println("Palindrome");
          else
               System.out.println("Not a palindrome");
     }
}
```

8. Find Roots of quadratic equation.

```
class Quadratic
{
   public static void main(String args[])
   {
        double a=8, b=4, c=4, desc,r1,r2,real,img;

        if(a==0)
        {
             System.out.println("Linear Equation with one root");
             System.out.println("And the root is " + (-c/b));
        }
        else
        {
             desc=b*b-4*a*c;
             if(desc==0)
             {
                  r1= -b/(2*a);
                  System.out.println("Real and equal roots");
                  System.out.println("r1 = "+r1 + "\n r2="+r1);
             }
             else if(desc>0)
             {
                  r1=(-b+Math.sqrt(desc))/(2*a);
```

```
                    r2=(-b-Math.sqrt(desc))/(2*a);
                    System.out.println("real and distinct");
                    System.out.println("r1=" +r1 + "\nr2=" +r2);
               }
               else
               {
                    real=-b/(2*a);
                    img=Math.sqrt(-desc)/(2*a);
                    System.out.println("The roots are imaginary");
               System.out.println("r1 = "+ real + " + "+img + "i");
               System.out.println("r2 = "+ real + " - " +img + "i");
               }
          }
     }
}
```

9. Show simulation of simple calculator.

```
class Calci
{
   public static void main(String args[])
   {
        int a=10, b=0;
        double result=0;
        char op = '/';

        switch(op)
        {
             case '+': result=a+b;  break;
             case '-': result=a-b;  break;
             case '*': result=a*b;  break;
             case '/': if(b==0)
                       {
                         System.out.println("Division by Zero!");
                           System.exit(0);
                       }
                       else
                           result=(double)a/b;
                       break;
             default : System.out.println("Invalid Operator!");
        }
        System.out.println("The result is " +result);
   }
}
```

10. Find average and standard deviation of elements in an array.

```
class AvgSD
{
   public static void main(String args[])
   {
        int a[]={10,12,6,9,45,32,67,23};
        int sum=0,sumsq=0,i;
        double avg, sd;

        for(i=0;i<a.length;i++)
        {
             sum+=a[i];
             sumsq+=a[i]*a[i];
        }
        avg=(double)sum/a.length;

        sd=Math.sqrt((double)sumsq/a.length - avg*avg);
        System.out.println("Average = " + avg);
        System.out.println("Standard Deviation = " + sd);
   }
}
```

11. Find factorial of a number.

```
   class Fact
   {
        public static void main(String args[])
        {
             int n=7,fact=1,i;

             if(n<0)
                  System.out.println("Factorial of negative number
                       can't be generated!");
             else
             {
                  for(i=1;i<=n;i++)
                       fact=fact*i;

                  System.out.println("Factorial of " + n + " is "
                       + fact);
             }
        }
   }
```

12. Generate Fibonacci sequence up to n.

```
class Fibo
{
   public static void main(String args[])
   {
        int n=10,i,fib1=0,fib2=1,fib3;

        if(n<=0)
             System.out.println("\nEnter a positive number");
        else
        {
             System.out.println("\nThe sequence is:\n");

             if(n==1)
                  System.out.println(fib1);
             else if(n==2)
                  System.out.println(fib1 +"\t" + fib2);
             else
             {
                  System.out.print(fib1 +"\t" + fib2);
                  for(i=3;i<=n;i++)
                  {
                       fib3=fib1+fib2;
                       System.out.print("\t" + fib3);
                       fib1=fib2;
                       fib2=fib3;
                  }
             }
        }
   }
}
```

13. Find the sum of all numbers from 1 to n except those which are divisible by 3.

```
class SumExcept3
{  public static void main(String args[])
   {
        int n= 10, i, sum=0;
        for(i=1;i<=n;i++)
        {
             if(i%3==0)
                  continue;

             sum+=i;
        }
        System.out.println("Sum="+sum);
   }
}
```

14. Find sum of first n natural numbers only till sum reaches 50.

```
class Sum50
{
	public static void main(String args[])
	{
		int n= 30, i, sum=0;

		for(i=1;i<=n;i++)
		{
			sum+=i;

			if (sum>50)
			{
				sum-=i;
				i--;
				break;
			}
		}
		System.out.println("i="+i);
		System.out.println("Sum="+sum);
	}
}
```

15. Check whether given number is prime or not.

```
class PrimeNum
{
	public static void main(String args[])
	{
		int i, n=41,flag=1;

		for(i=2;i<n;i++)
		{
			if(n%i==0)
			{
				flag=0;
				break;
			}
		}
		if(flag==1)
			System.out.println(n + " is prime");
		else
			System.out.println(n + " is not a prime");
	}
}
```

16. Generate prime numbers up to n.

```
class PrimeSeries
{
     public static void main(String args[])
     {
          int i,j, n=41,flag;

          for(i=2;i<=n;i++)
          {
               flag=1;

               for(j=2;j<i;j++)
               {
                    if(i%j==0)
                    {
                         flag=0;
                         break;
                    }
               }
               if(flag==1)
                    System.out.println(i);
          }
     }
}
```

17. Find sum of two matrices

```
class MatSum
{  public static void main(String args[])
   {
       int a[][]={{1,2},{3,4},{5,6}},b[][]={{-2,5},{4,12},{0,-4}};
        int sum[][]=new int[3][2];
        int i,j;

        for(i=0;i<a.length;i++)
             for(j=0;j<a[0].length;j++)
                  sum[i][j]=a[i][j]+b[i][j];

        System.out.println("\nThe addition of two matrices:\n");

        for(i=0;i<a.length;i++)
        {
             for(j=0;j<a[0].length;j++)
                  System.out.print(sum[i][j] + "\t");
             System.out.println();
        }
   }
}
```

18. Find Multiplication of two matrices.

```
class MatProduct
{
     public static void main(String args[])
     {
          int a[][]={{1,2},{3,4},{5,6}},b[][]={{-2,5,4},{4,12,1}};
          int pro[][]=new int[3][3];
          int i,j,k;

          for(i=0;i<a.length;i++)
               for(j=0;j<b[0].length;j++)
               {
                    pro[i][j]=0;
                    for(k=0;k<a[0].length;k++)
                         pro[i][j]=pro[i][j]+a[i][k]*b[k][j];
               }

          System.out.println("\nThe product of two matrices:\n");

          for(i=0;i<pro.length;i++)
          {
               for(j=0;j<pro[0].length;j++)
                    System.out.print(pro[i][j] + "\t");
               System.out.println();
          }
     }
}
```

19. Find transpose of a matrix.

```
   class MatTrans
   {
     public static void main(String args[])
     {
          int a[][]={{1,2,3},{4,5,6}},i,j;
          int trans[][]=new int[3][2];

          for(i=0;i<3;i++)
               for(j=0;j<2;j++)
                    trans[i][j]=a[j][i];

          System.out.println("Given matrix:");
          for(i=0;i<2;i++)
          {
               for(j=0;j<3;j++)
                    System.out.print(a[i][j] + "\t");

               System.out.println();
```

```
            }
            System.out.println("Transpose is:");
            for(i=0;i<3;i++)
            {
                 for(j=0;j<2;j++)
                      System.out.print(trans[i][j] + "\t");

                 System.out.println();
            }
   }
}
```

20. Find the sum of elements on principal diagonal of a matrix

```
   class SumDiag
   {
      public static void main(String args[])
      {
           int a[][]={{1,2,3},{3,4,5},{5,6,8}};
           int i,j,sum=0;

           for(i=0;i<a.length;i++)
                for(j=0;j<a[0].length;j++)
                     if(i==j)
                          sum+=a[i][j];

           System.out.println("Sum of elements on Diagonal="+sum);
      }
   }
```

21. Find minimum and maximum element in an array.

```
   class MinMaxArray
   {
      public static void main(String args[])
      {
           int a[]={1,2,-3, 45,3,41,56,15,62,-8};
           int min=0,max=0,i;

           for(i=0;i<a.length;i++)
           {
                if(min>=a[i])
                     min=a[i];

                if(max<=a[i])
                     max=a[i];
           }

           System.out.println("Minimum="+min);
```

```
        System.out.println("Maximum="+max);
    }
}
```

22. Search for a key element in a given array.

```
class Linear
{
    public static void main(String args[])
    {
        int a[]={12, 5, -4, 23, 6, 45},i,flag=0,key=20;

        for(i=0;i<a.length;i++)
        {
            if(a[i]==key)
            {
                flag=1;
                break;
            }
        }

        if(flag==1)
            System.out.println("Key is found at the position " +
                                                        (i+1));
        else
            System.out.println("Key is not found");
    }
}
```

23. Sort a given array in ascending order.

```
class Bubble
{
    public static void main(String args[])
    {
        int a[]={12, 5, -4, 23, 6, 45},i,j, temp;

        for(i=1;i<a.length;i++)
        {
            for(j=0;j<a.length-i;j++)
            {
                if(a[j]>a[j+1])
                {
                    temp=a[j];
                    a[j]=a[j+1];
                    a[j+1]=temp;
                }
            }
        }
```

```
        System.out.println("Sorted List:");
        for(i=0;i<a.length;i++)
            System.out.println(a[i]+ "\t");
    }
}
```

24. Print the following pattern:

A
A B
A B C
A B C D

```
class CharPat
{
    public static void main(String args[])
    {
        int Count=0;

        for(int i=1;i<=4;i++)
        {
            Count=1;
            for(int j=65;j<=68;)
            {
                System.out.print((char)j + "\t");
                if(Count<i)
                {
                    j++;
                    Count++;
                }
                else
                    break;
            }
            System.out.println();
        }
    }
}
```