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1. Write a program to perform binary search.

```
import java.util.Scanner;
class BinarySearch
{
  public static void main(String args[])
  {
    int c, first, last, middle, n, search, array[];
   Scanner in = new Scanner(System.in);
    System.out.println("Enter number of elements");
    n = in.nextInt();
    array = new int[n];
System.out.println("Enter " + n + " integers");
for (c = 0; c < n; c++)
      array[c] = in.nextInt();
  System.out.println("Enter value to find");
    search = in.nextInt();
first  = 0;
    last   = n - 1;
    middle = (first + last)/2;
   while( first <= last )
    {
      if ( array[middle] < search )
        first = middle + 1;
      else if ( array[middle] == search )
      {
        System.out.println(search + " found at location " +
(middle + 1) + ".");
        break;
      }
      else
         last = middle - 1;
```

```
      middle = (first + last)/2;
    }
    if (first > last)
      System.out.println(search + " isn't present in the list.\n");
  }
}
```

1-Sample Input:

12
23
45
56
value to find
45

Sample Output:

45 found at location 3.

2-Sample Input:

21
27
6
value to find
21

Sample Output:

21 found at location 1.

2.Write a program to display a matrix in spiral order.

```
import java.io.*;
 import java.util.*;
class spiral
 {
   static void spiralPrint(int m, int n, int a[][])
   {
      int i, k = 0, l = 0;
      while (k < m && l < n) {
             for (i = l; i < n; ++i) {
          System.out.print(a[k][i] + " ");
        } k++;
         for (i = k; i < m; ++i) {
          System.out.print(a[i][n - 1] + " ");
        } n--;
         if (k < m) {
          for (i = n - 1; i >= l; --i) {
             System.out.print(a[m - 1][i] + " ");
          }
          m--;}
         if (l < n) {
          for (i = m - 1; i >= k; --i) {
             System.out.print(a[i][l] + " "); }
          l++;
        } } }
    public static void main(String[] args)
   {
      Scanner sc=new Scanner(System.in);
   System.out.println("enter length");
```

```
     int R=sc.nextInt();
      int C=sc.nextInt();
    int a[][]=new int[R][C];
    for(int i=0;i<R;i++)
{
    for(int j=0;j<C;j++)
 {
    System.out.println("enter no.");
    a[i][j]=sc.nextInt();
 } }
for ( int k=0;k<R;k++){
    for(int l=0;l<C;l++)
    {
     System.out.print("  "+a[k][l]); }
     System.out.println(""); }
        spiralPrint(R, C, a);
    }
}
```

1-Sample Input:

2 3 4
5 6 7

Sample Output:

2 3 4 7 6 5

2-Sample Input:

1 2 3
8 0 9
31 12 11

Sample Output:

1 2 3 9 11 12 31 8 0

3. Write a program to display transpose of a matrix.

```
import java.util.Scanner;
class TransposeAMatrix
{
  public static void main(String args[])
  {
    int m, n, c, d;
    Scanner in = new Scanner(System.in);
    System.out.println("Enter the number of rows and
columns of matrix");
    m = in.nextInt();
    n = in.nextInt();
    int matrix[][] = new int[m][n];
     System.out.println("Enter the elements of matrix");
    for (c = 0; c < m; c++)
      for (d = 0; d < n; d++)
        matrix[c][d] = in.nextInt();
   System.out.println("Original matrix");
    for (c = 0; c < n; c++)
    {
      for (d = 0; d < m; d++)
          System.out.print(matrix[c][d]+"\t");
     System.out.print("\n");}

    int transpose[][] = new int[n][m];

    for (c = 0; c < m; c++)
      for (d = 0; d < n; d++)
        transpose[d][c] = matrix[c][d];
```

```
    System.out.println("Transpose of the matrix:");
    for (c = 0; c < n; c++)
    {
      for (d = 0; d < m; d++)
           System.out.print(transpose[c][d]+"\t");
     System.out.print("\n");
    }
  }
}
```

1-Sample Input:

Original matrix

1 2 3

4 5 6

7 8 9

Sample Output:

Transpose of the matrix:

1 4 7

2 5 8

3 6 9

2-Sample Input:

Original matrix

11 21 31

44 55 66

Sample Output:

Transpose of the matrix:

11 44

21 55

31 66

4. Write a program to perform bubble sort in an array.

```
import java.util.Scanner;
class bubble_sort
{ public static void main(String []args)
{int n, c, d, swap;
   Scanner in = new Scanner(System.in);
 System.out.println("Input number of integers to sort");
   n = in.nextInt();
  int array[] = new int[n];
  System.out.println("Enter " + n + " integers");
  for (c = 0; c < n; c++)
     array[c] = in.nextInt();
   for (c = 0; c < ( n - 1 ); c++)
 {
    for (d = 0; d < n - c - 1; d++)
 {
      if (array[d] > array[d+1])
      {
        swap       = array[d];
        array[d]   = array[d+1];
        array[d+1] = swap;
      }
}
}
  System.out.println("Sorted list of numbers:");
  for (c = 0; c < n; c++)
     System.out.println(array[c]);
  }
}
```

1-Sample Input:

8
5
9
2

Sample Output:

Sorted list of numbers:
2
5
8
9

2-Sample Input:

81
52
93
24
56

Sample Output:

Sorted list of numbers:
24
52
56
81
93

5. Write a program to add to matrices.

```
import java.util.Scanner;
class AddTwoMatrix
{
public static void main(String args[])
  {
 int m, n, c, d;
     Scanner in = new Scanner(System.in);
    System.out.println("Enter the number of rows and
columns of matrix");
     m = in.nextInt();
     n  = in.nextInt();
    int first[][] = new int[m][n];
     int second[][] = new int[m][n];
     int sum[][] = new int[m][n];
     System.out.println("Enter the elements of first matrix");
   for (c = 0; c < m; c++)
       for (d = 0; d < n; d++)
          first[c][d] = in.nextInt();
      System.out.println("Enter the elements of second
matrix");
    for (c = 0 ; c < m ; c++)
       for (d = 0 ; d < n ; d++)
          second[c][d] = in.nextInt();
     for (c = 0; c < m; c++)
       for (d = 0; d < n; d++)
           sum[c][d] = first[c][d] + second[c][d];
 System.out.println("Sum of the matrices:");
   for (c = 0; c < m; c++)
     {
 for (d = 0; d < n; d++)
```

```
            System.out.print(sum[c][d]+"\t");
        System.out.println();
        }
    }
}
```

1-Sample Input:

first matrix
1 2
3 4
second matrix
3 4
5 6

Sample Output:

Sum of the matrices:
4 6
8 10

2-Sample Input:

first matrix
10 2 5
43 43 9
second matrix
39 4 1
55 76 8

Sample Output:

Sum of the matrices:
49 6 6
98 119 17

6. Write a program to reverse a string.

```
import java.util.*;
class ReverseString
{
  public static void main(String args[])
  {
    String original, reverse = "";
    Scanner in = new Scanner(System.in);

    System.out.println("Enter a string to reverse");
    original = in.nextLine();

    int length = original.length();

    for (int i = length - 1 ; i >= 0 ; i--)
      reverse = reverse + original.charAt(i);

    System.out.println("Reverse of the string: " + reverse);
  }
}
```

1-Sample Input:

My name is Anuja.

Sample Output:

Reverse of the string: .anujA si eman yM

2-Sample Input:

Computer

Sample Output:

Reverse of the string: retumoC

7. Write a program to check if the entered string is palindrome or not.

```
import java.util.*;
class Palindrome
{
  public static void main(String args[])
  {
    String original, reverse = "";
    Scanner in = new Scanner(System.in);
    System.out.println("Enter a string to check if it's a
palindrome");
    original = in.nextLine();

    int length = original.length();

    for (int i = length - 1; i >= 0; i--)
      reverse = reverse + original.charAt(i);

    if (original.equals(reverse))
      System.out.println("The string is a palindrome.");
    else
      System.out.println("The string isn't a palindrome.");
  }
}
```

1-Sample Input:

madam

Sample Output:

The string is a palindrome.

2-Sample Input:

Computer

Sample Output:

The string isn't a palindrome.

8. Write a program to count the number of vowels and consonants.

```
import java.util.*;
public class string
{
   public static void main(String args[])
   {
   Scanner sc=new Scanner(System.in);
   System.out.println("enter the word");
   String m=sc.nextLine();String b="";
   StringTokenizer st=new StringTokenizer(m);
   int x=st.countTokens();int n=10000;
   for(int i=0;i<=n;i++)
   {
    b=st.nextToken();
   int c=0;int j=0;
   String d=b.toLowerCase();
   int l=d.length();
   for(i=0;i<l;i++)
   {
    char p=d.charAt(i);
    if(p=='i'||p=='o'||p=='e'||p=='a'||p=='u')
   ++c;
    else
    j++;
   } System.out.println(b  + "vowels       consonants");
    System.out.println(b  +"\t" + c  + "\t" +      j);
    }
    }}
```

1-Sample Input:

Anuja

Sample Output:

Anuja vowels consonants
Anuja 3 2

2-Sample Input:

Computer

Sample Output:

Computer vowels consonants
Computer 3 3

9. Write a program to find all substrings of a string.

```
import java.util.Scanner;

class SubstringsOfAString
{
  public static void main(String args[])
  {
    String string, sub;
    int i, c, length;

    Scanner in = new Scanner(System.in);
    System.out.println("Enter a string to print all its
substrings");
    string  = in.nextLine();

    length = string.length();
System.out.println("Substrings of \""+string+"\" are:");

    for (c = 0; c < length; c++)
    {
      for(i = 1; i <= length - c; i++)
      {
        sub = string.substring(c, c+i);
        System.out.println(sub);
      }}
  }
```

1-Sample Input:

fun

Sample Input:

Substrings of "fun" are:
f
fu
fun
u
un
n

1-Sample Input:

tea

Sample Input:

Substrings of "fun" are:
t
te
tea
a
ea
a

10. Write a program to display fibbonacci series upto n terms.

```
import java.util.*;

class fibbonacci
{
  public static void main(String args[])
  {

    Scanner sc = new Scanner(System.in);
    System.out.println("how many terms in fibbonacci
series");
    int n=sc.nextInt();
    String x="a",y="b",z="ab";
    System.out.println(x+"\n"+y);
    for(int i=2;i<n;i++)
    {
       x=y;
       y=z;
       System.out.println(z);
       z=y.concat(x);
       }
    }
}
```

1-Sample Input:

```
5
```

Sample Output:

```
a
b
ab
abb
abbab
```

2-Sample Input:

```
3
```

Sample Output:

```
a
b
ab
```

11. Write a program to check if a number is palprime or not.

```
import java.util.*;
class PalPrime
{
   public static void main(String args[])
   {
      Scanner in= new Scanner(System.in);
      int n,p,rev,s=0,i,c=0;
      System.out.println("Enter No.");
      n= in.nextInt();
      p=n;
      for(i=1;i<=p;i++)
      {
         if(p%i==0)
         {
            c++;
         }
      }
      while(n>0)
      {
         rev=n%10;
         s=s*10+rev;
         n=n/10;
      }
      if(p==s&&c==2)
      {
         System.out.println("Number is PalPrime : "+p);
      }
      else
```

```
    {
        System.out.println("Number is not PalPrime : "+p);
    }
} }
```

1-Sample Input:

313

Sample Output:

Number is PalPrime : 313

2-Sample Input:

34

Sample Output:

Number is not PalPrime : 34

12. Write a program to check if a number is evil number or not.

```
import java.util.*;
 public class JavaEvilNumber {
 String toBinary(int number) {
int r;String s = "";
            char dig[] = { '0', '1' };
while (number > 0) {
r = number % 2;
s = dig[r] + s;number = number / 2;
}return s;
}int countOne(String s)
{
int c = 0, l = s.length();char ch;
for (int i = 0; i < l; i++) {
ch = s.charAt(i);
if (ch == '1') {
c++;}
}return c;
}
       public static void main(String args[]) {
JavaEvilNumber ob = new JavaEvilNumber();
Scanner scanner = new Scanner(System.in);
                  System.out.print("Enter a positive number : ");
int number = scanner.nextInt();
               String bin = ob.toBinary(number);
System.out.println("Binary Equivalent = " + bin);
 int x = ob.countOne(bin);
System.out.println("Number of Ones = " + x);
```

```
if (x % 2 == 0)
System.out.println(number + " is an Evil Number.");
else
System.out.println(number + " is Not an Evil Number.");
}
}
```

1-Sample Input:

420

Sample Output:

Binary Equivalent = 110100100
Number of Ones = 4
420 is an Evil Number.

2-Sample Input:

659

Sample Output:

Binary Equivalent = 1010010011
Number of Ones = 5
659 is Not an Evil Number.

13. Write a program to check if a number is emirp number or not.

```
import java.util.*;
class Emirp
{
  public static void main(String args[])
  {
    Scanner sc=new Scanner(System.in);
    char ch;
    int i,c=0,r,n2=0,c1=0;
    System.out.println("Enter The Number: ");
    int n=sc.nextInt();

    for(i=1;i<=n;i++)
    {
      if(n % i == 0)
        c++;
    }
    if(c == 2)
    {
      r = n % 10;
      n2 = (n2 * 10) + r;
      n = n / 10;
    }
    for(i=1;i<=n2;i++)
    {
      if(n2 % i == 0)
        c1++;
    }
    if ( c ==2 && c1 ==2)
```

```
    {
        System.out.println("***Emirp Number***\n");
    }
    else
    {
        System.out.println("***Not Emirp Number***\n");
    }

    }
}
```

1-Sample Input:

13

Sample Output:

31

Number is Emirp

2-Sample Input:

17

Sample Output:

71

Number is Emirp

14. Write a program to print nth Ugly number.

```
import java.util.*;
   class ugly
   {
   public static void main(String anuja[])
   {
   Scanner s=new Scanner(System.in);
   System.out.println("no?");
   int n=s.nextInt();
   int sum=0,h=0,g=0,j;
   for(int i=1;h<=n;i++)
   {g=1;
  for(j=i;j!=1;j=j/g)
  {
   if(j%2==0)
  g=2;
  else if(j%3==0)
  g=3;
  else if(j%5==0)
  g=5;
  else
  break;}
  if(j==1)
  h++;
  }
  System.out.println(n+"th ugly number is "+sum);}}
```

1-Sample Input:

10

Sample Output:

10th ugly number is 12

2-Sample Input:

15

Sample Output:

15th ugly number is 24

15. Write a program to print the smallest required number whose sum of all digits which is equal to n and m is the range.

```
import java.util.*;
   class number
   {
   public static void main(String args[])
   {
    Scanner sc=new Scanner(System.in);
   System.out.println("entr value of m and n");
   int m=sc.nextInt();
   int n=sc.nextInt();
   int sum=0;int c=0;
  if(m>=100&&m<=10000&&n<100)
    {
    for(int i=m;i<=10000;i++)

    {sum=0;
    for(int j=i;j!=0;j=j/10)
    {
    int rem=j%10;
    sum=sum+rem;}
    if(sum==n)
    {
    System.out.println(“the required number is ”+i);
    for(int j=i;j!=0;j=j/10)
    c++;
    System.out.println("the number of digits is "+c);
    break;
    }}}
```

```
    else
    {
     System.out.println("not valid");
     }
}}
```

1-Sample Input:

100
11

Sample Output:

The required number is 119
the number of digits is 3

2-Sample Input:

99
11

Sample Output:

not valid