

1. WAP to print the factors of a number?

```
class A
{
    public static void main (String args)
    {
        int a = 6;
        for (int i=1; i<=a; i++)
        {
            if (a % i == 0)
            {
                System.out.println(i);
            }
        }
    }
}
```

2. WAP to count the factors/divisors of a number?

```
class A
{
    public static void main (String args)
    {
        int n = 7;
        int count = 0;
        for (int i=1; i<=n; i++)
        {
            if (n % i == 0)
            {
                count++;
            }
        }
        System.out.println(count);
    }
}
```

3. WAP to check whether the number is prime or not.

```
import java.util.Scanner;
class A
{
    public static void main (String args)
    {
        Scanner sc = new Scanner (System.in);
        System.out.print ("Enter the value");
        int n = sc.nextInt();
        int count = 0;
        for (int i=1; i<n; i++)
        {
            if (n % i == 0)
            {
                count++;
            }
        }
        if (count == 1)
            System.out.println ("Prime");
        else
            System.out.println ("Not Prime");
    }
}
```

Q1. WAP to

```
if (count == 2)
{
    s.o.println("It is a prime number");
}
else
{
    s.o.println("not a prime number");
}
```

Assignment
1. Sum of factors; Perfect number
Class A

```
s.psvm({} args)
{
    int n = 6;
    int sum = 0;
    for (int i = 1; i < n; i++)
    {
        if (n % i == 0)
        {
            sum = sum + i;
        }
    }
    s.o.println(sum);
    if (n == sum)
        s.o.println("PN");
    else
        s.o.println("not a PN");
}
```

2. Find the greatest number

```
import java.util.Scanner;
```

Class A

```
s.psvm({} args)
{
    Scanner sc = new Scanner(System.in);
    s.o.println("Enter the value");
    int n = sc.nextInt();
    int ld;
    int mark = 0;
    while (n > 0)
    {
        ld = ld % 10;
        if (ld > mark)
            mark = ld;
    }
    s.o.println(mark);
}
```

realme Shot by Mr Biswajit

2023/06/01 10:29 s.o.println(mark);

D. 17.04.23

1. WAP to reverse a number.

```
import java.util.Scanner;  
class A  
{  
    public static void main(String[] args)  
    {  
        Scanner sc = new Scanner(System.in);  
        System.out.println("Enter the value");  
        int n = sc.nextInt();  
        int temp = n;  
        int ld;  
        int rev = 0;  
        while (n != 0)  
        {  
            ld = n % 10;  
            rev = rev * 10 + ld;  
            n = n / 10;  
        }  
        System.out.println(rev);  
    }  
}
```

a. Check the number is pallindrome or not.

```
class A  
{  
    public static void main(String[] args)  
    {  
        int n = 32123; // for checking  
        int temp = n; // for checking  
        int ld; // for checking  
        int rev = 0; // for checking  
        while (n != 0)  
        {  
            ld = n % 10; // for checking  
            rev = rev * 10 + ld; // for checking  
            n = n / 10; // for checking  
        }  
        if (rev == temp)  
        {  
            System.out.println("Number is palindrome");  
        }  
        else  
        {  
            System.out.println("Not a palindrome number");  
        }  
    }  
}
```

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2023/06/09 11:29

if the sum of power of total number
of digit is equal to the actual no.

4. Armstrong Number

class +

```
{ psvm(8[ ] args)
```

```
{ int n = 153;
```

```
int temp = n;
```

```
int sum = 0;
```

```
int ld;
```

```
int power;
```

```
int count = total(n);
```

```
while (n != 0)
```

```
{ ld = n % 10;
```

power

```
p = power(ld, count);
```

```
sum = sum + p;
```

```
n = n / 10;
```

```
if (sum == temp)
```

```
{ s-o-pm("It is a strong number")
```

```
else
```

```
{ s-o-pm("It is not a strong number");
```

```
} public static int total(int a)
```

```
{ int count = 0;
```

```
while (a != 0)
```

```
{ count++;
```

```
a = a / 10;
```

```
} return count;
```

```
public static int power(int x, int n)
```

```
{ int p = 1;
```

```
for (int i = 1; i <= n; i++)
```

```
{ p = p * x;
```

```
}
```

3. Strong Number

The sum of factorial of digits is similar to the actual number is called strong number.

class A

```
{ psvm (& [ ] args)
```

```
{ int n = 145;
```

```
int temp = n;
```

```
int fact;
```

```
int sum = 0;
```

```
int ld;
```

```
while (n != 0)
```

```
{ ld = n % 10;
```

```
sum = sum + fact;
```

```
fact = factorial (ld);
```

```
sum = sum + fact;
```

```
} n = n / 10;
```

```
if (temp == sum)
```

```
{ s.o.pn ("It is a strong number");
```

```
else {
```

```
} s.o.pn ("not strong number");
```

```
public static int factorial (int a)
```

```
{ int fact = 1;
```

```
for (int i = 1; i <= a; i++)
```

```
{ fact = fact * i;
```

```
} return fact;
```

D-20.09.23

1. Prime numbers b/w? the ranges,

```
import java.util.Scanner;
```

Class A

```
{ psvm (S[] args)
```

```
{ Scanner sc = new Scanner(System.in);
```

```
int start = sc.nextInt();
```

```
int end = sc.nextInt();
```

```
for (int j = start; j < end; j++) // outer loop
```

```
{ int n = j;
```

```
int count = 0;
```

```
for (int i = 1; i < j; i++) // inner loop
```

```
{ if (n % i == 0)
```

```
{ count++; }
```

```
if (count == 2)
```

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

```
}
```

2. Print the Nth number (prime),

Class A

```
{ psvm (S[] args)
```

```
{ int nth = 6;
```

```
int ncount = 0;
```

```
for (int j = 1; true; j++)
```

```
{ int n = j;
```

```
int count = 0;
```

```
for (int i = 1; i < j; i++)
```

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```

if (count == 2)
{
    nCount++;
    if (nCount == nth)
        goOn(n);
    break;
}

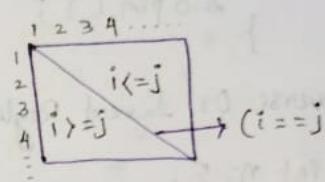
```

loop } nested loop

Pattern

1. square →

D-24.09.23



Program:- class &

{ svm (& L ang)}

{ int $\eta = 5$;

```
for (int i=1; i<=n; i++)
```

{ S.O.P. ("*");

8.0.9ln();

3

```
int n=5;
```

```
for(int i=1; i<=n; i++)
```

```
{ for( int j=1 ; j <=n ; j++ )
```

{ if ($i > j$)

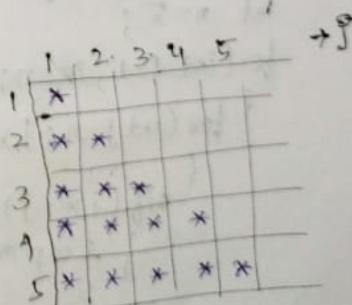
{ S.O.P("★");

P188

→ s.o.-point (" ") ;

realme

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Right-angle Triangle

6. Mirror invert Right Angle Triangle

```

int n=5;
for(int i=1; i<=n; i++)
{
    for(int j=n; j>=i; j--)
    {
        if(i<=j)
            &0.print("*");
        else
            &0.print(" ");
    }
    &0.println();
}

```

```

* * * * *
* * * *
* * *
* *

```

7. Mirror Diagonal.

```

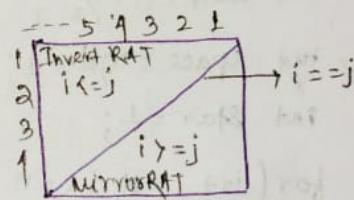
int n=5;
for(int i=1; i<=n; i++)
{
    for(int j=n; j>=i; j--)
    {
        if(i==j)
            &0.print("*");
        else
            &0.print(" ");
    }
    &0.println();
}

```

```

* *
* *
* *
* *

```



8. Pyramid

```

int n=5
int space=n-1;
int star=1;
for(int i=1; i<=n; i++)

```

```

5 4 3 2 1
* * * * *
* * * * *
* * * * *
* * * * *
* * * * *

```

```

{
    for(int j=1; j<=space; j++) // to print space
    {
        &0.print(" ");
    }
}
```

```

    for(int k=1; k<=star; k++) // to print stars
    {
        &0.print("*");
    }
}
```

&0 realme | Shot by @Mr Biswajit

space--; 2023/06/09 11:29
} star+=2;

3. Diagonal

```
int n=5;  
for(int i=1; i<=n; i++)  
{  
    for(int j=1; j<=n; j++)  
    {  
        if(i==j)  
        {  
            cout << "*";  
        }  
        else  
        {  
            cout << " ";  
        }  
    }  
    cout << endl;  
}
```

(n = 5) if

using

* * * * *

*

*

*

*

*

*

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*

6. M+8806

int

for(

{

7. MIRROR

int

for(

{

4. Reverse Or Invert Right angle triangle

```
int n=5;  
for(int i=1; i<=n; i++)  
{  
    for(int j=1; j<=n; j++)  
    {  
        if(i>j)  
        {  
            cout << "*";  
        }  
        else  
        {  
            cout << " ";  
        }  
    }  
    cout << endl;  
}
```

* * * * *

*

*

*

*

*

*

*

*

*

*

*

*

*

*

*

*

*

*

*

*

*

*

*

*

*

*

*

5. Mirror Right angle triangle.

```
int n=5;  
for(int i=1; i<=n; i++)  
{  
    for(int j=n; j>i; j--)  
    {  
        if(j==i){  
            cout << "*";  
        }  
        else{  
            cout << " ";  
        }  
    }  
    cout << endl;  
}
```

* * * * *

*

*

*

*

*

*

*

*

*

*

*

*

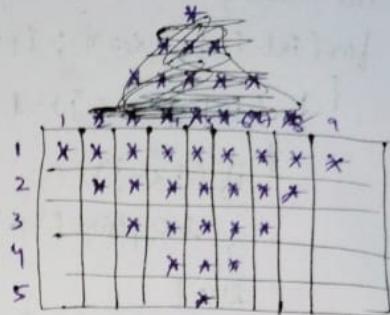
*

*

```

9. int n=5;
    int space = 0;
    int star = (n*2)-1;
    for(int i=1; i<=n; i++)
    {
        for(int j=1; j<=space; j++)
            s.o.print(" ");
        for(int k=1; k<=star; k++)
        {
            s.o.print("*");
        }
        s.o.println();
        space++;
        star -= 2;
    }

```

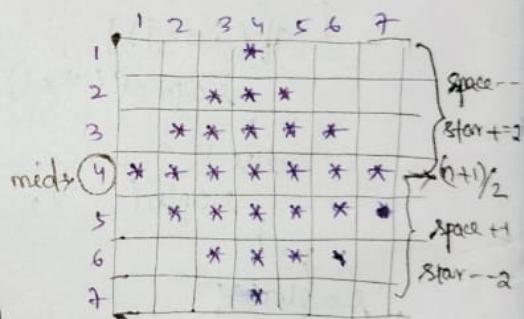


Invert pyramid / Triangle

```

10. int n=7;
    int mid = (n+1)/2;
    int space = mid - 1;
    int star = 1;
    for(int i=0; i<n; i++)
    {
        for(int j=1; j<=space; j++)
            s.o.print(" ");
        for(int k=1; k<=star; k++)
        {
            s.o.print("*");
        }
        s.o.println();
        if(i < mid)
        {
            space--;
            star += 2;
        }
        else
            star -= 2;
    }

```



11. int n=

```

for (int i=1; i<=n; i++)
{
    for (int j=1; j<=i; j++)
        s.o.print("*");
    s.o.println();
}

```

12. int n=

```

for (int i=1; i<=n; i++)
{
    for (int j=i; j<=n; j++)
        s.o.print("*");
    s.o.println();
}

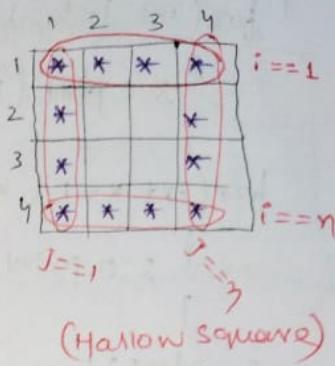
```

13.

```

int n=4;
for(int i=1; i<=n; i++)
{
    for(int j=1; j<=n; j++)
    {
        if(i==1 || j==1 || i==n
           || j==n)
        {
            cout.print("*");
        }
        else
        {
            cout.print(" ");
        }
    }
    cout.println();
}

```

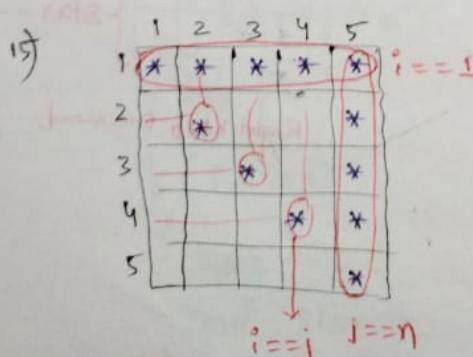
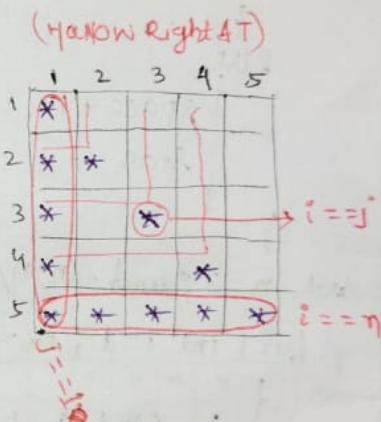


14.

```

int n=5;
for(int i=1; i<=n; i++)
{
    for(int j=1; j<=n; j++)
    {
        if(i==n || j==1 || i==j)
        {
            cout.print("*");
        }
        else
        {
            cout.print(" ");
        }
    }
    cout.println();
}

```



(Invert Hollow RAT)

D-26.04.23

11. int $n=7$, mid = $(n+1)/2$, space = mid - 1, star = 1;

for (int i=1; i<n; i++)

{ for (int j=1; j<=space; j++)

{ s.o.print(" ");

}

for (int k=1; k<=star; k++)

{ s.o.print("*");

}

s.o.println();

if (i < mid)

{ space--;

star++;

}

else

{ space++;

star--;

}

}

12. int $n=7$, mid = $(n+1)/2$, star = 1

for (int i=1; i<=n; i++)

{ for (int j=1; j<=star; j++)

{ s.o.print("*");

}

s.o.println();

if (i < mid)

{ star++;

}

else

{ star--;

}

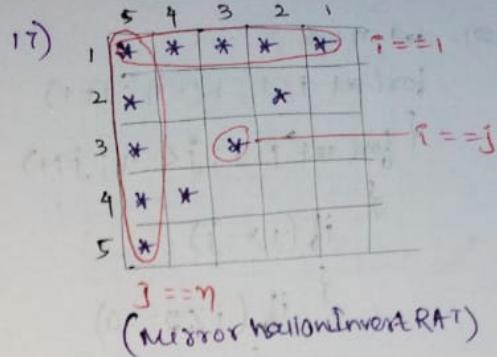
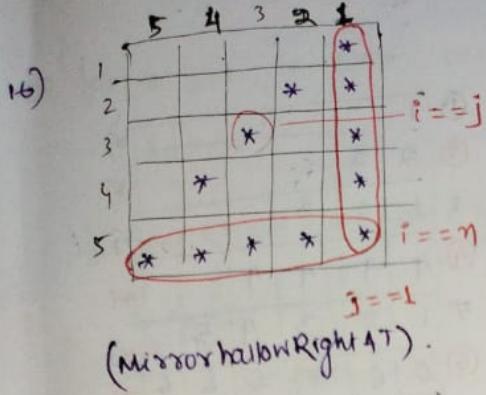
}

	1	2	3	4
1	*			*
2		*	*	
3	*	*	*	
4	*	*	*	*
5		*	*	*
6		*	*	
7		*		

Left half Diamond.

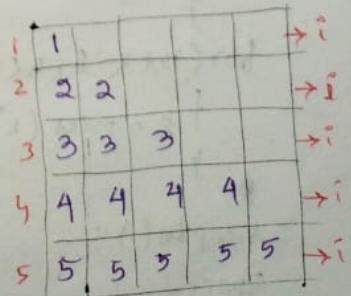
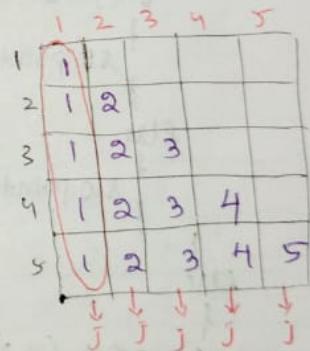
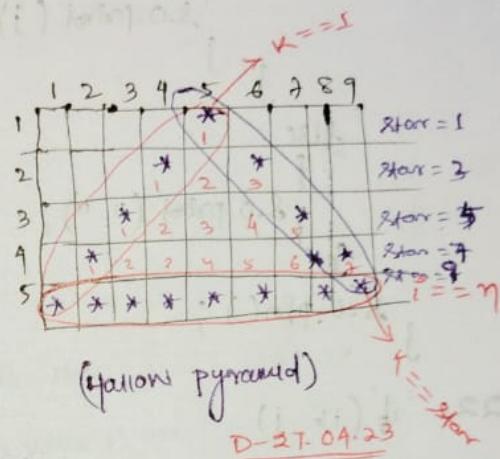
	1	2	3	4
1	*			
2	*	*		
3	*	*	*	
4	*	*	*	*
5	*	*	*	
6	*	*		
7	*			

Right half Diamond



18) int $n = 5;$
 $\text{int space} = n - 1; \& \text{star} = 1;$
 $\text{for} (\text{int } i = 1; i <= n; i++)$
 {
 $\text{for} (\text{int } j = 1; j <= \text{space}; j++)$
 {
 $\text{s.o.print}(" ")$;
 }
 $\text{for} (\text{int } k = 1; k <= \text{star}; k++)$
 {
 $\text{if} (i == n \text{ || } k == 1 \text{ || } k == \text{star})$
 $\text{s.o.print}("*")$;
 else $\text{s.o.print}(" ")$;
 }
 $\text{s.o.println}()$;
 $\text{space}--$
 $\text{star}++$;
 }
 }
 19. int $n = 5;$
 $\text{for} (\text{int } i = 1; i <= n; i++)$
 {
 $\text{for} (\text{int } j = 1; j <= n; j++)$
 {
 $\text{if} (i > j)$
 $\text{s.o.print}(j)$;
 else
 $\text{s.o.print}(" ")$;
 }
 $\text{s.o.println}()$;
 }.

20. $\text{for} (\text{int } j = 1; j <= n; j++)$
 {
 $\text{if} (i > j)$
 {
 $\text{s.o.print}(i)$;
 }
 else
 {
 $\text{s.o.print}(" ")$;
 }
 $\text{s.o.println}()$;
 }.



```

21. int n = 6 ;
    for( int i = 1 ; i <= n ; i++ )
    {
        for( int j = 1 ; j <= n ; j++ )
        {
            if( i >= j )
            {
                if( i % 2 == 0 )
                {
                    s.o.print( i );
                }
            }
            else
            {
                s.o.print( j );
            }
        }
        else
        {
            s.o.print( " " );
        }
    }
    s.o.println();
}

```

①	1					$\rightarrow j$
②	2	2				$\rightarrow i$
3	1	2	3			$\rightarrow j$
④	4	4	4	4		$\rightarrow i$
5	1	2	3	4	5	$\rightarrow j$
⑥	6	6	6	6	6	$\rightarrow i$

```

22. if (i>=j)
    {
        if (j>=0)
            {
                s.o.print(0);
            }
        else
            {
                s.o.print(1);
            }
        else
            {
                s.o.print(" ");
            }
    }
}

```

	1	2	3	4	5
1	1	0			
2	1	0	1		
3	1	0	1	0	
4	1	0	1	0	1
	↓	↓	↓	↓	↓
	1	0	1	0	1

```
23. for(int j=1; j<=space; j++)
    {
        g.o.print(" ");
    }
for(int k=1; k<=star; k++)
{
    g.o.print(k);
}
g.o.println();
space--;
star+=2;
```

1	11		→ K				
11	2	3	→ K				
1	2	3	4	5	→ K		
1	2	3	4	5	6	7	→ K

```

24. {
    for(int j=1; j <= space; j++)
    {
        cout.print(" ");
    }
    for(int k=1; k <= star; k++)
    {
        if(k%2 == 0)
        {
            cout.print("0");
        }
        else
        {
            cout.print("1");
        }
    }
    cout.println();
    space--;
    star += 2;
}

```

			1		
	1	0	1		
1	0	1	0	1	
1	0	1	0	1	0

25. int n=5, space = n-1, star = 1;

for(int i=1; i <= n; i++) //represents row

```

    {
        int a=1; // for every new row a value is one.
        for(int j=1; j <= space; j++)
        {
            cout.print(" ");
        }
        for(int k=1; k <= star; k++)
        {
            if(k < i)
            {
                cout.print(a);
            }
            a++;
        }
        cout.println();
        space--;
        star += 2;
    }
    cout.println();
    space--;
    star += 2;
}

```

			1		
	1	2	1		
1	2	3	2	1	
1	2	3	4	3	2

```

else
    s.o.print(" ");
}
s.o.println();
}

```

```

29. int n=4;
int a=1; int char ch='A';
char ch='A';
for(int i=1; i<=n; i++)
{
    char ch='A';
    for(int j=1; j<=n; j++)
    {
        if(i==j)
        {
            if(i==j)
            {
                s.o.print(ch++);
            }
        }
        else
        {
            s.o.print(j);
        }
    }
    s.o.print("\n");
    s.o.println();
}

```

1	2	3	4
1	B		
1	2	C	
1	2	3	D

D-29.04.23

```

30. int n=5;
int a=1;
for(int i=1; i<=n; i++)
{
    char ch='A';
    for(int j=1; j<=n; j++)
    {
        if(i==j)
        {
            if(i%2==0)
            {
                s.o.print(a++);
            }
        }
        else
        {
            s.o.print(ch++);
        }
        a++;
    }
    s.o.println();
}

```

1				
A	B			
4	5	6		
A	B	C	D	
11	12	13	14	15

D-28.09.23

```

26. int n=4;
char ch='A';
for(int i=1; i<=n; i++)
{
    for(int j=1; j<=n; j++)
    {
        if(i==j)
        {
            cout<<ch++;
        }
        else
        {
            cout<<" ";
        }
    }
    cout<<endl;
}

```

1	2	3	4
A			
B	C		
D	E	F	
G	H	I	J

```

27. int n=4;
for(int i=1; i<=n; i++)
{
    char ch='A';
    for(int j=1; j<=n; j++)
    {
        if(i==j)
        {
            cout<<ch++;
        }
        else
        {
            cout<<" ";
        }
    }
    cout<<endl;
}

```

1	2	3	4
A			
A B			
A B C			
A B C D			

```

28. int n=5;
int a=1;
for(int i=1; i<=n; i++)
{
    int b=a+n-i; // calculate b value
    // for every new row
    for(int j=1; j<=n; j++)
    {
        if(i==j)
        {
            if(j!=0)
            {
                cout<<a++ <<" ";
            }
        }
    }
    cout<<endl;
}

```

1	2	3	4	5
9	8	7	6	① ② ③ → increase
10	11	12		④ → decrease
	14	13		
		15		

```

int [] a = new int [n];
for( int i=0 ; i<a.length ; i++)
{
    a[i] = sc.nextInt();
}
for( int var ; a)
{
    s.o.println(var);
}
}.

```

Q WTP to print the prime numbers present in an array,

```

import java.util.Scanner;
class A
{
    public static void main (String args[])
    {
        Scanner sc = new Scanner (System.in);
        s.o.println("Enter the size");
        int n = sc.nextInt();
        int [] arr = new int [n];
        for( int i=0 ; i<arr.length ; i++)
        {
            arr[i] = sc.nextInt();
        }
        for( int i=0 ; i<arr.length ; i++)
        {
            int n = arr[i];
            int count = 0;
            for( int j=1 ; j<n ; j++)
            {
                if( n%j == 0 )
                {
                    count++;
                }
            }
            if( count == 2 )
            {
                s.o.println(n);
            }
        }
    }
}

```

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1. WAP to find the largest number from array D- 3.05.23

```
import java.util.Scanner;  
class A  
{  
    public static void main(String[] args)  
    {  
        Scanner sc = new Scanner(System.in);  
        int length = sc.nextInt();  
        int arr[] = new int[length];  
        for(int i=0; i<arr.length-1; i++)  
        {  
            arr[i] = sc.nextInt();  
        }  
  
        // Logic  
        int max = arr[0];  
        for(int i=0; i<arr.length-1; i++)  
        {  
            int n = arr[i];  
            if(n > max)  
            {  
                max = n;  
            }  
        }  
        System.out.println(max);  
    }  
}
```

2. 2nd Largest

```
int fl = Integer.MIN_VALUE;  
int sl = Integer.MIN_VALUE;  
for(int i=0; i<arr.length-1; i++)  
{  
    int n = arr[i];  
    if(n > fl)  
    {  
        sl = fl;  
        fl = n;  
    }  
    else if(n > sl & n != fl)  
    {  
        sl = n;  
    }  
}  
System.out.println(sl);  
  
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```

input
34, 2, 45, 1, 45

Output
34.

3. Find the length of the array without using length variable

```
int arr = {1, 2, 3, 4, 5};  
int count = 0;  
for (int i = 0; true; i++)  
{  
    try  
    {  
        int n = arr[i];  
        count++; // catch exception  
    }  
    catch (ArrayIndexOutOfBoundsException e)  
    {  
        break; // once get exception stop it  
    }  
    System.out.println(count);  
}
```

```
int arr = {1, 2, 3, 4, 5};  
int count = 0;  
for (int a : arr)  
{  
    count++;  
}  
System.out.println(count);
```

3. and Smartest

```
int fm = Integer.MAX_VALUE;
```

```
int sm = Integer.MAX_VALUE;
```

```
for (int i = 0; i < a.length; i++)
```

```
{  
    int n = a[i];
```

```
    if (n < fm)
```

```
    {  
        sm = fm;
```

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```

else if (num < sm && num != fm)
{
    sm = num;
}
s.o.println(sm);
}

```

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4. reverse an array or swapping of Array :

```
int [] arr = {42, 13, 34, 18, 92}
```

```
int start = 0, end = arr.length - 1;
```

```
while (start < end)
```

```
{
    int temp = arr[start];
```

```
    arr[start] = arr[end];
```

start = 0 42

end = arr.length - 1 13 34 18 92

```
    arr[end] = temp;
```

① 92 13 34 18 42

```
    start++;

```

② 92 18 34 13 42

```
    end--;

```

```
}
```

```
for (int a : arr)
```

```
{
```

```
    s.o.println(a);
```

```
}
```

5. Inserting data into array .

```
int [] arr = {17, 81, 90, 5};
```

```
int [] temp = new int [arr.length + 1];
```

```
int ind = 2, data = 40;
```

```
int index = 0;
```

```
for (int i = 0; i < temp.length; i++)
```

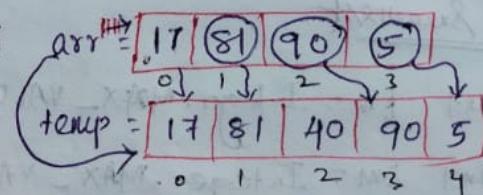
```
{
    if (i == ind)
```

```
        temp[i] = data;
```

```
    else
```

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arr = temp;

// re-initializing the array

```
arr = temp;
```

```
for (int a : arr)
    { s.o.println(a);
    }
```

6) Deleting or removing data from array.

```
int [] arr = {17, 81, 90, 5};
```

```
int [] temp = new int [arr.length - 1];
```

```
int index = 0; int index = 0;
```

```
for (int i = 0; i < arr.length; i++)
```

```
{ if (i != index)
```

~~```
temp[i] = arr[i + 1];
```~~~~```
else
```~~~~```
{ temp[i] = arr[index + 1]; }
```~~

```
arr = temp;
```

```
for (int b : arr)
```

```
{
```

```
 s.o.println(b);
}
```

```
}
```

17 81 90 5

17 81 5

if ( $i \neq index$ )

```
{ temp[index + 1] = arr[i]; }
```

7. WAP to search an element in the array.

```
int [] arr = { 7, 18, 81, 20 } ;
int k = 81 ;
int count = 0 ;
for (int i = 0 ; i < arr.length ; i++)
{ int n = arr[i] ;
if (n == k)
{ count++ ;
} break ;
}
if (count == 1)
{ System.out.println ("found") ;
}
else
{ System.out.println ("not found") ;
}
```

8. WAP to print the frequency of element.

```
int [] arr = { 1, 2, 1, 3, 1, 5, 4 } ;
boolean [] b = new boolean [arr.length] ;
for (int j = 0 ; j < arr.length ; j++)
{ int n = arr[j] ;
if (b[j] == false)
{ int count = 0 ;
for (int i = 0 ; i < arr.length ; i++)
{ if (n == arr[i])
{ if (arr[i] == n)
{ count++ ;
} b[i] = true ;
}
}
System.out.println (n + " occurred " + count + " times") ;
}
```

### Diagrams

①  $n \in \mathbb{N}$

Count  $\boxed{0} \times 2$

|      |      |      |      |      |      |
|------|------|------|------|------|------|
| true | true | true | true | true | true |
| 0    | 1    | 2    | 3    | 4    | 5    |

②  $n \notin \mathbb{Z}$

Count  $\boxed{1} \perp$

③  $x \boxed{1} \rightarrow$  true so not execute

Count  $\boxed{0}$

TD-6.05.23

### 9. Bubble sort:-

- i) Bubble sort is a mechanism to arrange the data in ascending or descending order.
- ii) In bubble sort algorithm if there are  $n$  number of data then  $n-1$  iteration is needed.
- iii) For every iteration one data is placed in its actual position.
- iv) If " $n-1$ " data are sorted then remaining one data is sorted automatically.
- v) For every iteration first data is compared with 2nd data, 2nd data is compared with 3rd, ... .  $n^{\text{th}}$  data is compared with number of unsorted data.

{5, 9, 11, 20, 1}

①

|   |   |    |    |   |
|---|---|----|----|---|
| 5 | 9 | 11 | 20 | 1 |
|---|---|----|----|---|

$i=0$

$i < n$

② 1st - 2nd (0, 1)

④ 4th - 5th (3, 4)

|   |   |    |    |   |
|---|---|----|----|---|
| 5 | 9 | 11 | 20 | 1 |
|---|---|----|----|---|

③ 2nd - 3rd (1, 2)

|   |   |    |   |    |
|---|---|----|---|----|
| 5 | 9 | 11 | 1 | 20 |
|---|---|----|---|----|

→ Sorted

$j < i$

|   |   |    |    |   |
|---|---|----|----|---|
| 5 | 9 | 11 | 20 | 1 |
|---|---|----|----|---|

⑤ 3rd - 4th (2, 3)

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(I)

i=1

|        |   |    |   |    |
|--------|---|----|---|----|
| 5      | 9 | 11 | 1 | 20 |
| sorted |   |    |   |    |

j=0 ① 1<sup>st</sup>-2<sup>nd</sup> (0, 1)

|   |   |    |   |    |
|---|---|----|---|----|
| 5 | 9 | 11 | 1 | 20 |
|---|---|----|---|----|

j=1 ② 2<sup>nd</sup>-3<sup>rd</sup> (1, 2)

|   |   |    |   |    |
|---|---|----|---|----|
| 5 | 9 | 11 | 1 | 20 |
|---|---|----|---|----|

j=2 ③ 3<sup>rd</sup>-4<sup>th</sup> (2, 3)

|   |   |   |    |        |
|---|---|---|----|--------|
| 5 | 9 | 1 | 11 | 20     |
|   |   |   |    | sorted |

(II)

i=2

|        |   |    |   |    |
|--------|---|----|---|----|
| 5      | 9 | 11 | 1 | 20 |
| sorted |   |    |   |    |

j=0 ① 1<sup>st</sup>-2<sup>nd</sup> (0, 1)

|   |   |   |    |    |
|---|---|---|----|----|
| 5 | 9 | 1 | 11 | 20 |
|---|---|---|----|----|

j=1 ② 2<sup>nd</sup>-3<sup>rd</sup> (1, 2)

|   |   |   |    |        |
|---|---|---|----|--------|
| 5 | 1 | 9 | 11 | 20     |
|   |   |   |    | sorted |

(III)

i=3

|        |   |   |    |    |
|--------|---|---|----|----|
| 5      | 1 | 9 | 11 | 20 |
| sorted |   |   |    |    |

j=0 ① 1<sup>st</sup>-2<sup>nd</sup> (0, 1)

|   |   |   |    |        |
|---|---|---|----|--------|
| 1 | 5 | 9 | 11 | 20     |
|   |   |   |    | sorted |

Program:-

```
int [] arr = {5, 9, 11, 20, 1};
```

```
int n = arr.length - 1;
```

```
for (int i = 0; i < n; i++)
```

```
{ for (int j = 0; j < n - i; j++)
```

```
{ if (arr[j] > arr[j + 1])
```

```
{ int temp = arr[j];
```

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11. Re

b  
3  
10. Mer

```
for (int a : arr)
{
 s.o.pln(a);
}
```

D-08.09.23

## 10. Merging of two arrays...

```
int [] a1 = {2, 4, 6, 8};
```

```
int [] a2 = {10, 20, 5, 7};
```

```
int [] a3 = new int [a1.length + a2.length];
```

```
for (int i=0; i<a3.length; i++)
```

```
{ if (i < a1.length)
```

```
{ a3[i] = a1[i]; }
```

```
else
```

```
{ a3[i] = a2[i - a1.length]; }
```

```
for (int a : a3)
```

```
{ s.o.pln(a); }
```

2 4 6 8  
4-4  
5-4  
6-4  
8-4

10 20 5 7  
10 20 5 7  
8-4

2 4 6 8 10 20 5 7  
0 1 2 3 4 5 6 7

a1.length  
= 4

when  
i < a1.length

D-09.09.23

## 11. Removing & or deleting duplicates from Array.

```
int [] arr = {5, 2, 1, 2, 5, 3, 1};
```

```
boolean [] b = new boolean [arr.length];
```

```
for (int i=0; i<arr.length; i++)
```

```
{ int n = arr[i];
```

```
for (int j=i+1; j<arr.length; j++)
```

```
{ if (n == arr[j])
```

```
{ b[i] = true;
```

```
} realme Shot by @Mr Biswajit
```

~~for (int~~

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```

for (int i=0; i<arr.length; i++)
{
 if (b[i] != true)
 { s.o.println(arr[i]); }
}

```

OP  
7  
3

OP int [] arr = {5, 2, 1, 2, 5, 7, 3, 1, 2};

boolean [] b = new boolean [arr.length];

```

for (int i=0; i<arr.length; i++)

```

```

 { int n = arr[i];

```

```

 for (int j=i+1; j<arr.length; j++)

```

```

 { if (n == arr[j])

```

```

 { b[j] = true;

```

OP  
5 2 1 7 3

```

for (int i=0; i<arr.length; i++)

```

```

 { if (b[i])

```

```

 { if (b[i] != true)

```

```

 { s.o.println(arr[i] + " ");

```

## 12. Multi-Dimensional Array :-

Multi-Dimensional arrays are array of arrays.

Syntax:-

datatype [][]...[] var = new datatype [1D size]

[2D size] [3D size] ... [nD size];

Eg:-

int [][] [] a = new int [4] [3] [2];

a[2][1] = 50;

s.o.println(a.length); // 4  
s.o.println(a[0].length); // 3  
s.o.println(a[0][0].length); // 2

13. Read

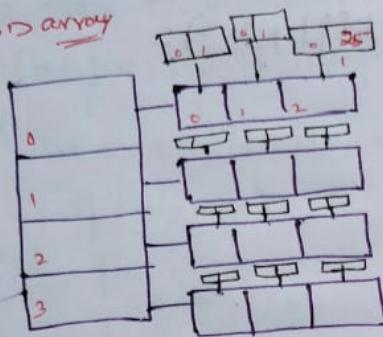
inp

c

8.0.println(a[0].length); // 2D length

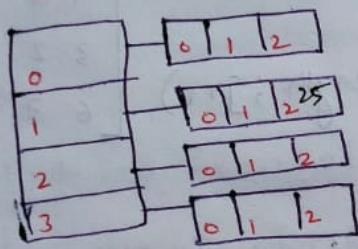
8.0.println(a[0][0].length); // 3D length

Diagram :- 3D array



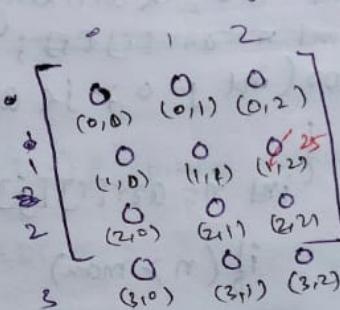
a[0][2][2] = 25;

2D Array



arr.length // 9 → row

arr[0].length // 3 → column



where [1][2] = 25

### 13. Read and Print (2D Array).

```
import java.util.Scanner;
class {
 public static void main(String[] args) {
 Scanner sc = new Scanner(System.in);
 int row = sc.nextInt();
 int col = sc.nextInt();
 int [][] arr = new int [row][col];
 for(int i=0; i<arr.length; i++) {
 for(int j=0; j<arr[i].length; j++) {
 arr[i][j] = sc.nextInt();
 }
 }
 }
}
```

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16. Greatest in every Row

```
for(int i=0; i<arr.length; i++)
{ int max = Integer.MIN_VALUE; //imp
 for(int j=0; j<arr[i].length; j++)
 {
 int n = arr[i][j];
 if(n > max)
 {
 max = n;
 }
 }
 System.out.println(max); //important
}
```

$\begin{bmatrix} 2 & 3 & 5 \\ 7 & 4 & 9 \\ 8 & 2 & 5 \end{bmatrix} \rightarrow$

17. Greatest in each column :-

```
for(int i=0; i<arr[0].length; i++) //represent columns
{ int max = Integer.MIN_VALUE;
 for(int j=0; j<arr.length; j++) //represent rows
 {
 int n = arr[j][i];
 if(n > max)
 {
 max = n;
 }
 }
 System.out.println(max);
}
```

$\begin{bmatrix} 0 & 1 & 2 & 3 \\ 1 & 15 & 7 & 3 \\ 2 & 1 & 3 & 6 \\ 5 & 3 & -2 & 4 \end{bmatrix}$

18. WAP to print the prime number in 2D array.

```
for(int i=0; i<arr.length; i++)
{
 for(int j=0; j<arr[i].length; j++)
 {
 int n = arr[i][j];
 int count = 0;
 for(int k=1; k<=n; k++)
 {
 if(n % k == 0)
 count++;
 }
 if(count == 2)
 System.out.print(n + " ");
 }
}
```

```
if (count == 2)
{
 f = open(n);
}
}
```

### 19. WAP to perform addition Matrix

```
import java.util.Scanner;
class A
{
 public static void main (String args[])
 {
 Scanner sc = new Scanner (System.in);
 int row = sc.nextInt();
 int col = sc.nextInt();
 int [][] arr1 = new int [row] [col];
 int [][] arr2 = new int [row] [col];
 int [][] arr3 = new int [arr1.length] [arr1[0].length];
 for (int i=0; i<arr1.length; i++)
 {
 for (int j=0; j<arr1[i].length; j++) { Read
 arr1[i][j] = sc.nextInt(); } two
 arr2[i][j] = sc.nextInt(); times
 }
 for (int i=0; i<arr3.length; i++)
 {
 for (int j=0; j<arr3[i].length; j++)
 {
 arr3[i][j] = arr1[i][j] + arr2[i][j];
 }
 }
 }
}
```

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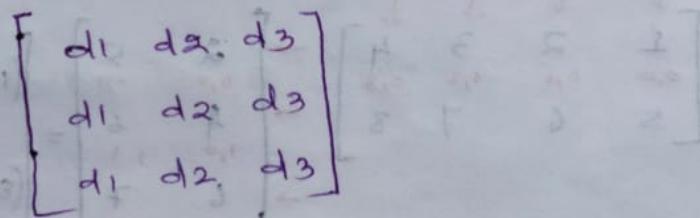
```

for (int i=0; i<arr3.length; i++)
{
 for (int j=0; j<arr3[i].length; j++)
 {
 System.out.print(arr3[i][j] + " ");
 }
 System.out.println();
}

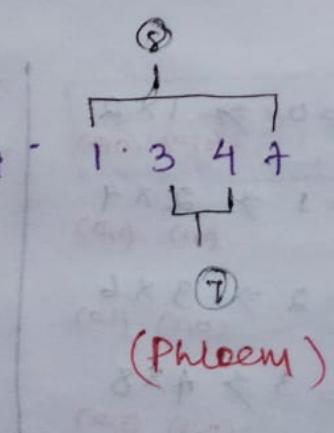
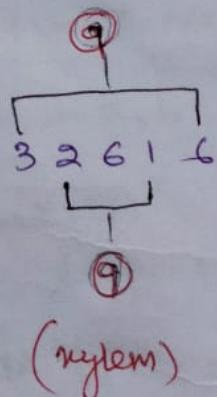
```

Syntax to create Multi-Dimensional Array.

datatype [ ] [ ] var = { {d1,d2,d3}, {d1,d2,d3}, {d1,d2,d3} } > 2D Array



datatype [ ] [ ] [ ] arr = { {{}, {}, {}}, {{}, {}, {}}, {{}, {}, {}} }



## D-15.05.23

### 2) Multiplication of 2D Array.

#### Rules

No of columns in arr1 should be similar to no of rows in arr2.

#### Dimension of Result Array

i) No of rows in result array should be similar to no of rows in arr1.

ii) No of col in result array should be similar to no of columns in arr2.

$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ 0,0 & 0,1 & 0,2 & 0,3 \\ 5 & 6 & 7 & 8 \end{bmatrix} \rightarrow \begin{bmatrix} 2 & 5 \\ 0,0 & 0,1 \\ 4 & 6 \\ 1,0 & 1,1 \\ 6 & 7 \\ 2,0 & 2,1 \\ 8 & 2 \\ 3,0 & 3,1 \end{bmatrix} = \begin{bmatrix} (1 \times 2 + 2 \times 4 + 3 \times 6 + 4 \times 8) & (1 \times 5 + 2 \times 6 + 3 \times 7 + 4 \times 2) \\ (8 \times 2 + 6 \times 4 + 7 \times 6 + 8 \times 8) & (5 \times 5 + 6 \times 6 + 7 \times 7 + 8 \times 2) \end{bmatrix}$$

(I)  $i=0$

$j=0$

$$k=0 \Rightarrow 1 \times 2 \\ (0,0) (0,0)$$

$$k=1 \Rightarrow 2 \times 4 \\ (0,1) (1,0)$$

$$k=2 \Rightarrow 3 \times 6 \\ (0,2) (2,0)$$

$$k=3 \Rightarrow 4 \times 8 \\ (0,3) (3,0)$$

$j=1$

$$k=0 \Rightarrow 1 \times 5 \\ (0,0) (0,1)$$

$$k=1 \Rightarrow 2 \times 6 \\ (0,1) (1,1)$$

$$k=2 \Rightarrow 3 \times 7 \\ (0,2) (2,1)$$

$$k=3 \Rightarrow 4 \times 2 \\ (0,3) (3,1)$$

`int [][] a1 = {{1,2,3,4},{5,6,7,8}};`

`int [][] a2 = {{2,5},{4,6},{6,7},{8,2}};`

`int [][] a3 = new int [a1.length] [a2[0].length];`

row

col

5.05.23

```
for (int i=0, i< a3.length ; i++)
{
 for (int j=0; j< a3[i].length ; j++)
 {
 for (int k=0; k< a3[i].length ; k++)
 {
 a3[i][j] += a1[i][k] * a2[k][j];
 }
 }
}

for (int i=0; i<a3.length; i++)
{
 for (int j=0; a3[i].length; j++)
 {
 System.out.print(a3[i][j] + " ");
 }
 System.out.println();
}
```

## 2) Fibonacci Series

Scanner s = new Scanner (System.in);

int n = s.nextInt();

int a=0, b=1;

0, 1, 1, 2, 3, 5, 8, 13, 21...

if (n==1)

System.out.print (a);

else if (n==2)

System.out.print (a + " " + b);

else if (n>2)

System.out.print (a + " " + b);

for (int i=3; i<=n; i++)

{  
 int c=a+b;

a=b;

b=c;

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2023/06/09 11:32

5.23

some or

### 3. Count Characters

```

String str = "SHREYAS";
int uc=0, lc=0, nc=0, sc=0;
for (int i=0; i<str.length(); i++) {
 char ch = str.charAt(i);
 if (ch >='A' && ch <='Z')
 uc++;
 else if (ch >='a' && ch <='z')
 lc++;
 else if (ch >='0' && ch <='9')
 nc++;
 else
 sc++;
}
System.out.println(uc);
System.out.println(lc);
System.out.println(nc);
System.out.println(sc);

```

Q1

4

2

2

1

### 4. WAP to perform addition of number in a String

Eg:- SH 27 EF 2;

### 5. WAP to search a character in String.

```

String str = "shefali";
int sum = 0;
for (int i=0; i<str.length(); i++) {
 char ch = str.charAt(i);
 if (ch >='0' && ch <='9') {
 sum = sum + (ch - 48);
 }
}

```

char = Number

Convert into  
char

gta

## String

D-16.05.23  
~~~~~

1. WAP to check whether the string is palindrome or not.

```

String str = "java";
String rev = "";
for (int i = str.length() - 1; i >= 0; i--) {
 char ch = str.charAt(i);
 rev = rev + ch;
}
System.out.println(rev);
if (str.equalsIgnoreCase(rev)) {
 System.out.println("It is palindrome");
} else {
 System.out.println("not palindrome");
}

```

2. Converting Uppercase to lowercase and lowercase to uppercase.

```

String str = "SH2E^3gTA";
String temp = "";
for (int i = 0; i < str.length(); i++) {
 char ch = str.charAt(i);
 if (ch >='A' && ch <='Z') {
 temp = temp + (char) (ch + 32); // Convert into character
 } else if (ch >='a' && ch <='z') {
 temp = temp + (char) (ch - 32);
 }
 temp = temp + ch;
}

```

$$\begin{array}{r}
 32 \\
 A = 65 \\
 + 32 \\
 \hline
 97 = a
 \end{array}
 \quad
 \begin{array}{r}
 32 \\
 a = 97 \\
 - 32 \\
 \hline
 65 = A
 \end{array}$$

(Number + char = Number)

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2023/06/09 11:32

3. Count d

String

int

for (

)

8

8

4. WAP

5. WAP

4.

5. String s = "Sheeta";  
char ch = 'e';  
if (s.indexOf(ch) == -1)  
{ s.out("Not found");  
}  
else  
{  
s.out("Found");  
}

or  
int count = 0;  
String s = "Laetla";  
char ch = 'L';  
for (int i=0; i < s.length(); i++)  
{ if (ch == s.charAt(i))  
{ count++;  
break;  
}  
if (count > 0)  
s.out("Found");  
else  
s.out("Not found");

## 6. Frequency

D-18.05.23

String str = "entertain";

String con = ""; // used to add char once it is counted  
for (int i=0; i < str.length(); i++)

{  
char ch = str.charAt(i); // if it is not counted  
if (con.indexOf(ch) == -1)  
{  
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int count = 0;

```

for (int j=0; j < str.length(); j++)
{
 if (ch == str.charAt(j))
 count++;
}

s.o.println(ch + " is repeated for " + count + " times");
con = con + ch; // adding char after counted
}
}

```

7. WAP to replace duplicate character using any character.

String str = "Apple";

```

for (int i=0; i < str.length(); i++)
{
 char ch = str.charAt(i);
 int count = 0;
 for (int j=0; j < str.length(); j++)
 {
 if (ch == str.charAt(j))
 count++;
 }

 if (count > 1)
 str = str.replace(ch, '#');
}

```

App  
Apple

s.o.println(str);

8. WAP to find the length of string without using inbuilt methods.

9. WAP to remove duplicate characters in a string.

8. String s = "java";

```

int count = 0;
char[] ch = s.toCharArray();
for (char a : ch)
{
 realme: Shot by @Mr Biswajit
 s.o.println(count);
}

```

s.o.println(count);

10. WAP to count the no of words present in a string.

String str = "Sheela is a cute girl";  
str = str.trim();  
int count = 0;  
for(int i=0; i < str.length(); i++)  
{  
 char ch = str.charAt(i);  
 if((ch == ' ' && str.charAt(i+1) != '.') || i == str.length() - 1)  
 {  
 count++;  
 }  
}  
System.out.println(count);

11. WAP to print the length of every word in a string

D- 19.05.23

O/P  
String s = "Java";  
int count = 0;  
for (int i=0; i< s.length(); i++)  
{ try {  
 char ch = s.charAt(i);  
 } count++;  
}  
catch (StringIndexOutOfBoundsException e)  
{  
 break;  
}  
s.o.println(count);

10. WAP

9. String s = "Apple";  
String con = " ";  
for (int i=0; i < s.length(); i++)  
{  
 char ch = s.charAt(i);  
 int count = 0;  
 for (int j=0; j < s.length(); j++)  
 {  
 if (ch == s.charAt(j))  
 {  
 count++;  
 }  
 }  
 if (count >= 1)  
 {  
 con = con + ch;  
 }  
}

11. WAP

s.o.println(  
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