for
while
do ..while

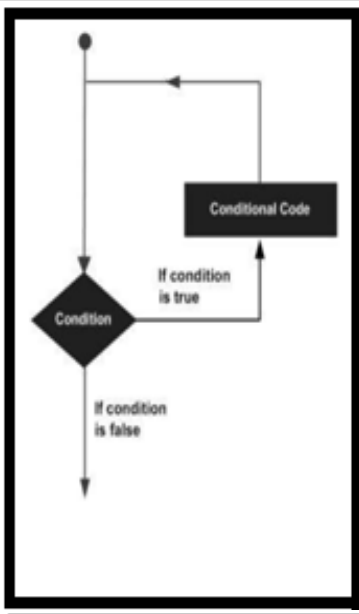
Loop

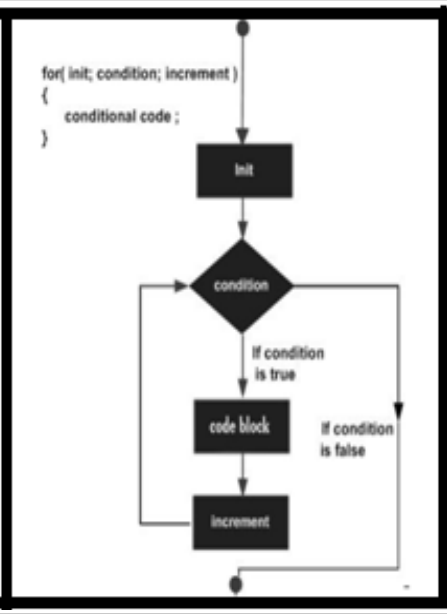
Repeatation of Statements

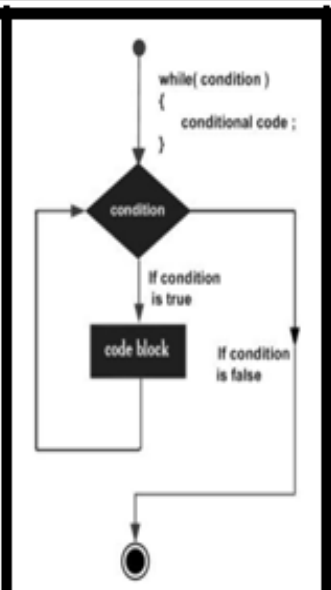
Starting Point	Increment /Decrement	Ending Point
AO (=)	I/D(++/--)	RO(<,>,<=,>=,!=)

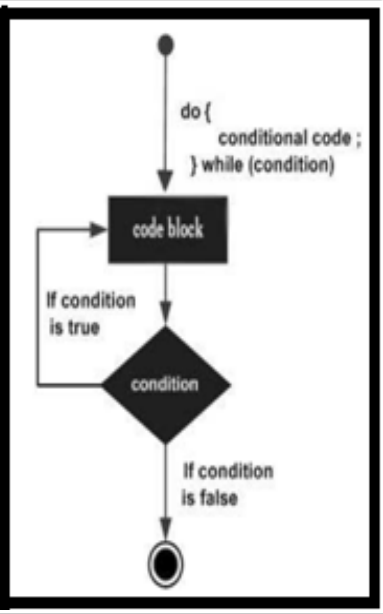
1,2,3,4,5,.....,15,16,17,18,19,20

20,19,18,.....5,4,3,2,1









Syntex:
for:

Full Static

```
for(SP;EP;I/D)
{
//statements/conditions/processes etc (repeat)
}
```

Example:

Display number from 1 to 10

```
for(i=1;i<=10;i++)
{
display :-> i
}
```

Syntex:
while

Partially static
Partially Dynamic

```
SP;
while(EP)
{
//statements/conditions/processes etc (repeat)
 I/D;
}
```

Entry control loop

Example:

Display number from 1 to 10

```
i=1;
while(i<=10)
{
display :-> i
i++
}
```

Syntex:
do while

Fully Dynamic

```
SP;
do
{
//statements/conditions/processes etc (repeat)
I/D;
}while(EP);
```

Exit control loop

Example:

Display number from 1 to 10

```
i=1;
do{
display :-> i
i++;
}while(i<=10);
```

 B-9, Bank Enclave, Shastri Nagar, Near Kartiya Chowk Ghaziabad g9_sharma@yahoo.com

Iteration (Loop – For ,While, Do While, Nested)

Set 1

1. WAP to display all number from 1 to 15.
2. WAP to display sum of all numbers from 1 to 10.
3. WAP to display Average of numbers from 1 to 6.
4. WAP to display multiply all numbers from 1 to 10.
5. WAP to display Square all numbers from 1to 7.
6. WAP to display Cube all numbers from 1to 8.
7. WAP to display all odd numbers from 1to 8
8. WAP to display all even numbers from 1to 8

Set 2

1. WAP to display all numbers from 1 to N.
2. WAP to display Sum number from 1 to N.
3. WAP to display Average number from 1 to N.
4. WAP to display Multiply number from 1 to N.
5. WAP to display Square Number from 1 to N.
6. WAP to display Cube all numbers from 1to N.
7. WAP to display all odd numbers from 1to N
8. WAP to display all even numbers from 1to N
9. WAP to display all 2 digit numbers from 1to N

Set 3

1. WAP to display of numbers from N to M.
2. WAP to display Sum of numbers from N to M.
3. WAP to display Average of numbers from N to M.
4. WAP to display multiply of numbers from N to M.
5. WAP to display Square of numbers from N to M.
6. WAP to display Cube number from N to M.
7. WAP to display all odd numbers from N to M.
8. WAP to display all even numbers from N to M.
9. WAP to display all 2 digit numbers from N to M.

Set 4

1. WAP to display even factors of a given number till N.
2. WAP to display odd factors of a given number till N.
3. WAP to display factorial of a given numbers.
4. WAP to check given number is prime or not
5. WAP to display all prime numbers from N to M.
6. WAP to check given two number are twin prime or not
7. WAP to check given numbers is perfect no or not.

Set 5

1. WAP to display result $\mathbf{x^n}$.
2. WAP to display result $\mathbf{(x+1)^n}$
3. WAP to display A if $\mathbf{A=P[1+r/100]^n}$
4. WAP to display Even and Odd numbers from N to M.
5. WAP to count Even and Odd numbers from N to M.
6. WAP to Add Even and Odd numbers in different variable from N to M.
7. WAP to calculate HCF(GCD) and LCM of two numbers
8. WAP to check max, min number in given 10 numbers

Set 6

1. WAP to display Reverse of a given numbers.
2. WAP to sum of all digit of a given numbers.
3. WAP to sum of all Even digit of a given numbers
4. WAP to sum of all odd digit of a given numbers
5. WAP to sum of all prime digit of a given numbers
6. WAP to print of all digit of a given numbers in different line
7. WAP to check given number is palindrome or not.121
8. WAP to check given number is Armstrom or not.153
9. WAP to check given number is duck or not.1034
10. WAP to check given number is Nelson or not.111,555
11. WAP to check given number is unique number or not.
12. WAP to check given number is BUZZ or not.endwith and divisible by 7
13. WAP to check given number is Composit number or not.(A number said to be a composit number if its has one or more then one factor excluding 1 ant the number itself like 4,6,8,9,…..)
14. WAP to Find smallest digit of a number.
15. WAP to Find higest digit of a number.
16. WAP to chack a numbers is strong numbers or not
17. WAP to chack all digit of numbers ascending order or not.
18. WAP to chack all digit of numbers decending order or not.

Set 7

1. WAP to display prime number between 1 to 1000
2. WAP to display perfect number between 1 to 100
3. WAP to find out all the Armstrom numbers between 1 to 1000
4. WAP to find out all the perfect numbers between 1 to 1000
5. WAP to find out all the palindrome number between 100 and 500.

Set 8

1) WAP to print Fibonacci series of n terms where n is input by user : 0, 1, 1, 2, 3, 5, 8, 13, 21,.. to N items

2) WAP to read WAP to display to check a number is automorphic or not.Ex.$(25)^2$= 625

3) WAP to chack a numbers is Special numbers or not

(a number is called as Special if it is equal to sum of the factorials of its digits. Example : 145=1!+4!+5!)

4) WAP ti check a two digit number is special , addition of all digit and multiplication of both digits then add addition and multiplication we get same number. Ex. **59**, 5+9=14, 5*9=45, 14+45=**59**

5) WAP of ISBN is unique number or not: The ISBN is based upon a 10-digit code. The ISBN is Legal if

$\mathbf{1*digit_1+2*digit_2+3*digit_3+4*digit_4+5*digit_5+6*digit_6+7*digit_7+8*digit_8+9*digit_9+10*digit_{10}}$

Ex: for and ISBN 1401601499

Sum= 1*1+2*4+3*0+4*1+5*6+6*0+7*1+8*4+9*9+10*9=253 which divisible by 11.

1. Input ISBN number.
2. If the ISBN is not a 10-digit integer,output **Illegal ISBN.**

3. If the ISBN is 10 digit integer or not divisible by 11 display **Illegal ISBN else Legal ISBN.**

6. WAP to print the following series

1) 2,4,6,8,10……n
2) 1,5,9,13…….n
3) 1,4,9,16…….n
4) 1,2,4,7,11,……n
5) 1,8,27,64……..n
6) 0,3,8,15,24,…..n
7) 3,6,9,12,……n
8) 2,5,10,17……n
9) 0,7,26,……n
10) 1,9,25,49,……n
11) 0,3,8,15,……..n
12) 24,99,224,399,……n
13) Sum=2-4+6-8+……..to n
14) Sum=1+12+123+1234+….n
15) Sum=1+11+111+1111+…n
16) Sum=3+33+333+3333+….n
17) Sum=1*2+1*2*3+1*2*3*4+…
18) Sum=1*2+2*3+3*4+……
19) n term …. 99,80,63,…..0..n^2-1
20) S=1/2+3/4+5/6+7/8+……19/20
21) S=1/2-3/4+5/6-7/8+……19/20

==========

22) S=2-4+6-8+……..-20
23) s=1/1+11/12+111/123+….n
24) S=x/1+x/2+x/3+……..n
25) Sum=$\frac{1}{1}+\frac{1+2}{1+2}+\frac{1+2+3}{1+2+3}+\ldots\frac{1+2+3+4+\cdots..+n}{1+2+3+4+\cdots..+n}$
26) Sum=$\frac{1}{1}+\frac{1*2}{1*2}+\frac{1*2*3}{1*2*3}+\ldots\frac{1*2*3*4*\ldots\ldots..*n}{1*2*3*4*\ldots\ldots..*n}$
27) s=1 + 1/2 + 1/3 + 1/4 + 1/5 +….1/n .
28) s=1 - 1/2 + 1/3 - 1/4 + 1/5 -……1/n .
29) S = 1+x+x^2/2+x^3/3+x^4/4+….x^n/n
30) S = 1+x/1+x^2+x^3+x^4+….x^n
31) 1/1!,3/3!,5/5!,7/7!,9/9!……n/n!
32) a/1!,a^3/3!,a^5/5!,a^7/7!,a^9/9!…a^n/n!
33) S=x+x^2 / 2! + x^3/3! +……+ x^n / n!
34) S=ax/1!+ax^2 / 2! + ax^3/3! ++ ax^n / n!
35) S=x/1!+x^2 / 2! + x^3/3! +…+ x^n / n!
36) S=x+x^2 / 2! + x^3/3! +……+ x^n / n!
37) S=x+ x^2 / 3 + x^3/5 +…+ x^n / 2n-1
38) S=x/1!+ x^2 / 3! + x^3/5! ++ x^n / 2n!-1

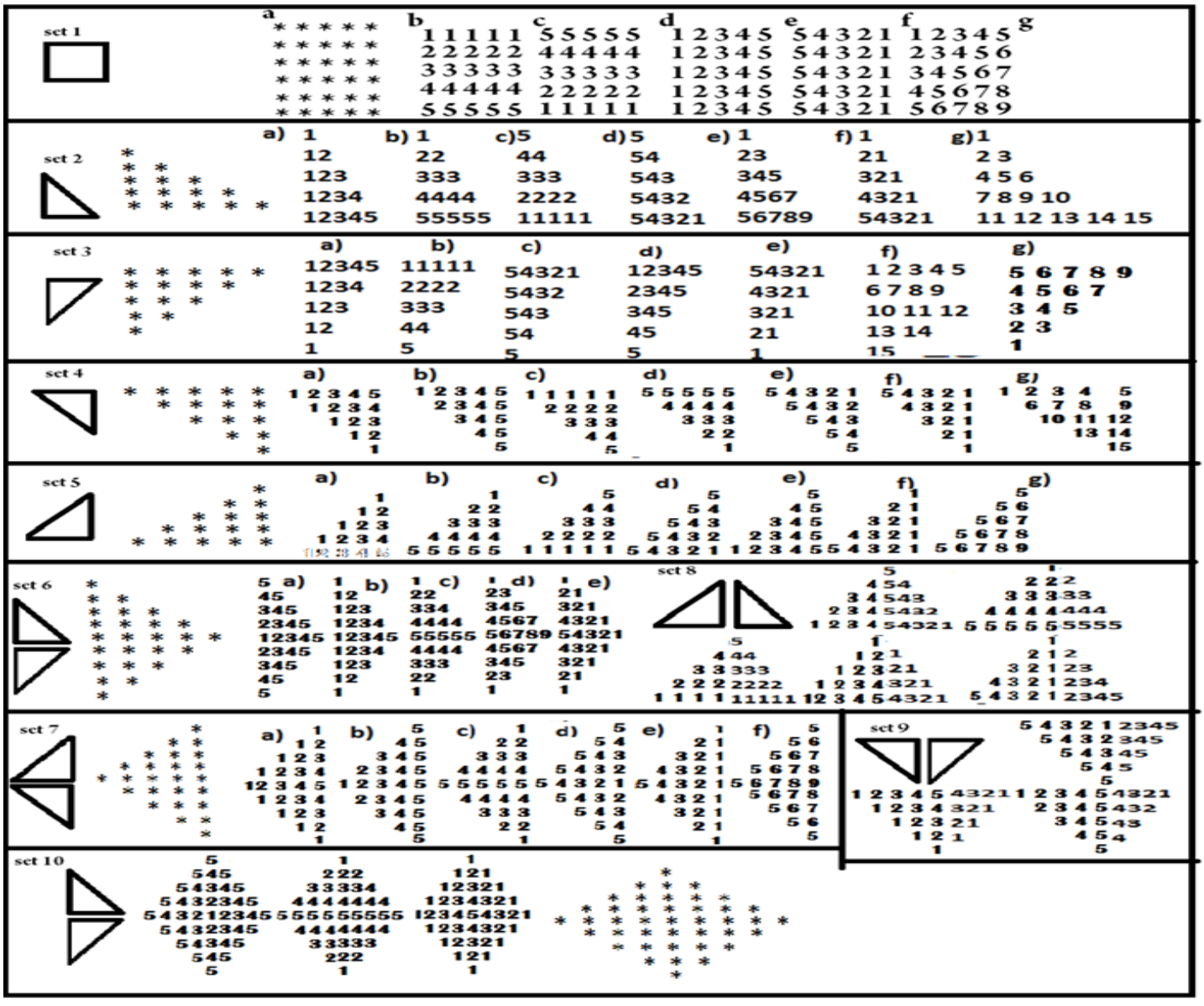
a.
```
1 2 3 4 5 6 7
1 2 3 4 5
1 2 3
1
```

b.
```
1 2 3 4 5
2 2 3 4 5
3 3 3 4 5
4 4 4 4 5
5 5 5 5 5
```

c.
```
1
3 1
5 3 1
7 5 3 1
9 7 5 3 1
```

d.
```
1 3 5 7 9
3 5 7 9 1
5 7 9 1 3
7 9 1 5 3
9 1 3 5 7
```

e.
```
1 3 5 7 9
3 5 7 9 1
5 7 9 3 1
7 9 5 3 1
9 7 5 3 1
```



Loops Output

Q1. what will be the output of following code snippet and how many times the following loop will be executed?

```
int a=10, b=3;
while (a>++b)
{
a--;
cout<<a<b; }
```

Q2. identify the output for the following code snippet with logic:

```
for(int i=2;i<15;i++)
{
while(i<6)
continue;
cout<<i*2;
}
```

Q3. convert the following for loop in to do-while loop:

1. for(int i=10,j=0;j<=10;i++,j=j+3) cout<<i<<j;
2. int x,c; for(x=10,c=20;c>=10;c=c-1) x++;

Q4. determine how many times the loop will execute and give the output:

```
int x=2,y=5;
do
{
++x;
y-=x++;
}while(x<=10;
return y;
```

Q5. determine how many times the loop will execute and give the output

```
for(int i=2;i<=20;i=i+2)
{
if(i%2==0)
continue;
cout<<i;
}
```

Q6. correct the error

```
int n[ ]={2,4,6,8,10};
for(int i=0;i<=5;i++)
cout<<"n["<<i<<"]="<<n[i] ;
```

Q7. give the output of the following:

```
int x=10; int y=20;
if((x<y)||(x=5)>10)
cout<<y;
else
cout<<x;
```

Q8. find the output:

```
int n = 6;
while ( n!=1)
{
if ( n % 2 == 0)
n = n / 2;
else
n = (3 * n ) + 1;
cout<<n;
}
```

Q9. analyze the following program segment and determine how many times the body of loop will be executed (show the working).

```
int p=4,q=96;
while (p<=q)
{
q = q / p;
cout<<q;
}
```

Q10. what will be the output of the following code?

```
int m=3,n=14;
for (int i=1;i<5;i++;
m++;
--n;
cout<<"m="<<m;
cout<<"n="<<n;
```

Q11. analyze the following program segment and determine how many times the loop will be executed and what will be the output of the program segment?

```
int a=100;
while (true)
{
if (a<50)
break;
a=a-10;
}
cout<<a;
```

Q12. how many times are the loop execute?

(i)
```
x=5;y=50;
while (x<=y)
x=y/x;
```

(ii)
```
int s=0,i=0;
while (i++<5)
s+=i;
```

Q13. convert the following segment into equivalent for loop.

```
int k=1,i=2;
while(++i<6)
k*=i;
```

Q14. analyse the following program segment and determine how many times the loop will be executed and what will be the output of the program segment?

```
int a=150;
while(true)
{
if(a<100)
break;
a=a-20;
}
cout<<a;
```

Q15. rewrite the following segment using ternary operator:

```
if(p>=5500)
s=p*(5/100)
else
s=p*(15/100)
```

Q16. convert the following if else construct to switch

```
if( ch=='a')
cout<<"administrator";
else if(ch=='s' || ch=='s')
cout<<"supervisor";
else if (ch=='m')
cout<<"manager";
else
cout<<"executive";
```

Q17. what will be the output?

```
class output
{
public static void main()
{
charch='a';
int i;
for(i=1;i<6;i++)
{
ch+=(char)(i;
cout<<ch;}
}}
```

Q18. convert the following in if else:

```
string grad=(mark>=90)? "a":
(mark>=80)? "b": "c"
```

Q19. convert the for loop to while loop

```
intx,c;
for(x=10,x=20;c>=10;c=c-2)
x++;
```

Q20. write output of the following :

```
int n=500, sales=50000;

bonus=n+(sales>1500)?250:100;
cout<<bonus;
```

Q21. write output of the following :

```
int a=5,b=0;
while(b<5)
{
b++;
cout<<a<<" " <<b;
}
cout<<a+" " +b;
```

Q22. find output value of z ?.

```
z = ((x+y)>2000) ?x+y:x-y;
```

1. int x = 1500, y = 750;
2. int x = 1000, y = 700;

Q23. find out the output of the following snippets

```
cout<< - 19 % 4 ;
cout<< - 19 % - 4 ;
cout<<'b' + 2 ;

cout<< "b" + 2 ;
```

Q24. what will be the output of following code snippet and how many times the following loop will be executed?

```
int a=10, b=3;
while (a>++b)
{
a--;
cout<<a+b;
}
```

Q25. convert the following for loop into do-while loop

```
int x=1, s=0;
for( ; ; )
{
if(x>5)
break;
s=s+x;
x++;
}
cout<<s;
```

Q26. give the output

```
class super{
void in( )
{
x=10,y=20;
if(x<y||(x==5)>10)
cout<<x;
else
cout<<y;}}
```

Q27. give the output

```
for(inti=0;i<=10;i++)
{
if(i==6)
break;}
cout<<i;
```

Q28. what is the output of the following?

```
double a=-5.0,b=-3.0,c=-
6.0,d=25.60,e;
e=math.abs(math.max(a,math.max(
b,c));
cout<<math.ceil(d)<<"\t"<<e;
```

Q29. what is the result produced by 2 – 10*3 + 100/11? show the steps.

Q30. identify the output for the following code snippet with logic:

```
for(int i=2;i<15;i++)
{
while(i<6)
continue;
cout<<i+2;
}
```

Q31. consier the following:

```
int a[]={2,5,8,5,3};
int i=2;
a[i]+=(a[i+1]++)-(--a[i-1];
for(i=0;i<5;i++)
cout<<a[i];
```

Q32. predict the output for:

```
cout<<"eight = " << 3 + 5;
cout<<"six = " <<(2+4);
```

Q33. what will be the output of following code snippet and how many times the following loop will be executed? int a=10, b=3;

```
while (a>++b)
{
a--;
cout<<a<<", "<<b<<"= "<<(a+b);
}
```

Q34. convert the following segment into equivalent for loop.

```
int k=1,i=2;
while(i++<6)
k+=i;
```

Find Output of the following

```
1. int a=5;
while(a<10)
{
cout<<a;
}
```

```
2. int a=5;
while(a<10)
{
a++;
cout<<a;
}
```

```
3. int a=5;
while(a<10)
{
cout<<a;
++a;
}
```

```
4. int a=7;
while(a>2)
{
cout<<a;
a++;
}
```

```
5. int a=1;
while(a<5)
{
a++;
cout<<a;
}
```

```
6. int a=1;
while(a<5)
{
a++;
cout<<a;
++a;
}
```

```
7. int a=21,b=5,c=0;
while(a>b)
{
c=a*b;
cout<<c;
a-=2;
b++;
}
cout<<a<<b;
```

```
8. int a=21,b=5,c=0;
while(a>b)
{
c=a+b;
cout<<c;
a--;
b+=2;
}
cout<<a<<b;
```

```
9. int a=1;
while(a<25)
{
a++;
cout<<a;
a+=3;
}
```

```
10.  int a=1;
while(a<5)
{
a++;
cout<<a;
++a;
}
```

```
11.  int a,b;
for(a=6,b=2;b<=10;b+=2,
a++)
        cout<<a<<b;
```

Find Out How Many Times The Following Code Executed

```
1.  int a=10,b=5,c=0;
while(a>b)
{
c=a+b;
a--;
b++;
}
2.  int a=10;
while(a<100)
{
a=a+10;
}
3.  int a=10;
while(a<=100)
{
    a=a+20;
}
4.  int a=10;
while(a<100)
{
a=a+10;
if (a>50)break;
}
5.  int a=10;
while(a<100)
{
a=a+10;
if (a>50)continue;
}
6.  int a,b;
for(a=1,b=5;b<=10;b+=2,
a++)
        cout<<a<<b;
7.  int a,b;
for(a=6,b=1;b<10;b+=4,a
++)
        cout<<a<<b;
8.  int a;
a=1;
do
{
 cout<<a<<b;
a+=3
}while(a<=10;
9.  int a;
a=11;
do
{
        cout<<a<<b;
a+=3
}while(a<=11;
10.  int a;
a=1;
do
{
cout<<a<<b;
a++;
}while(a>10;
```

Find Output

```
1.  int x,y;
 y=7;
for(x=0;x<5;x+)
{
cout<<y;
cout<<x*y;
}
2.  int i=1;
while(i<=10)
{
cout<<i;
i++;
}
3.  int i=11;
while(i<=10)
{
cout<<i+1;
i++;
}
cout<<i;
4.  int i=11;
while(i<=12)
{
cout<<i;
i=i+2;
}
cout<<i;
5.  int a=7,b=8;
for(int i=a;i<=b+3;i++)
cout<<a+1;
cout<<a+ “,”+b);
6.  int a=7,b=8;
for(int i=a;i<=b+3;i++)
cout<<a+3;
cout<<a+ “,”+(b-1);
7.  int a=7,b=8;
for(int i=a;i<=b+3;i++)
cout<<a+2;
cout<<(a+2)<<“,”<<b;
8.  int i=1,a;
while(i<=10)
{
a=a+2;
cout<<a);
cout<<(i+a);
i++;
}
cout<<a<< “,”<<i;
9.  int i,a=9;
for(i=10;i>=1;i-=3)
cout<<i<< “,”<<(a+i);
cout<<a);
for(i=10;i>1;i-=2)
cout<<i;
10.  int i,a=2;
for(i=10;i>=1;i-=3)
cout<<i<<“,”<<(a*i);
cout<<a;
```

Set 1	
1	7 : 0 7 : 7 7 : 14 7 : 21 7 : 28
2	1
3	11
4	11 13
5	8 8 8 8 8 7,8
6	10 7,7
7	9 9 9 9 9 9,8
8	2 3
9	10,197,164,131,10,99 9 9 9 9
10	10,207,144,81,2,2

1	false false false
2	4,6,8,10,12,14,16,18,20,22,24,26,28
3	10 011 312 613 9
3	11 12 13 14 15 16 17 18 19 20 21
4	4 : 2 6 : -3 8 : -10 10 : -19 12 : -30
5	2 4 6 8 10 12 14 16 18 20
6	n[0]=2 n[1]=4 n[2]=6 n[3]=8 n[4]=10
7	20
8	3,10,5,16,8,4,2,1
9	24 6 1
10	m=4 n=13
11	40
12	Infinite
12	5
13	3
14	90

17	B D G K P
20	750
21	5,1 5,2 5,3 5,4 5,5 5,5
22	2250, 300
23	-3 -3 100 b2
24	13 13 13
25	15

26	10
27	0 1 2 3 4 5
28	26.0 3.0
29	2 4 9 6 3
30	eight = 35 six = 6
31	9, 2= 11 8, 3= 11 7, 4= 11 6, 5= 11

1	5,6,7,8,9
2	6,7,8,9,10
3	5,6,7,8,9
4	Infinite
5	2,3,4,5
6	2,4
7	105 114 119 120 117 110
8	26 27 28 29 30 31 15, 17
9	2 6 10 14 18 22
10	2,4
11	6, 2 7, 4 8, 6 9, 8 10, 10

1	15, 10, 5 15, 9, 6 15, 8, 7
2	10 20 30 40 50 60 70 80 90
3	10 30 50 70 90
4	10 20 30 40 50
5	10 20 30 40 50 60 70 80 90
6	1 , 5 2 , 7 3 , 9
7	6 , 1 7 , 5 8 , 9
8	1, 1 4, 1 7, 1 10, 1
9	11, 1
10	Infinite

es of Questions

1

```
@@@@@
@@@@@
@@@@@
@@@@@
@@@@@
```

2

```
# # # # #
 # # # # #
  # # # #
   # # #
    # #
     #
```

3

```
@ @ @ @ @
 @ @ @ @
  @ @ @
   @ @
    @
```

4

```
#
# #
# # #
# # # #
# # # # #
```

5

```
        @
      @ @
    @ @ @
  @ @ @ @
@ @ @ @ @
```

6

```
12345
12345
12345
12345
12345
```

.7

```
54321
54321
54321
54321
54321
```

8

```
55555
44444
33333
22222
11111
```

9

```
11111
22222
33333
44444
55555
```

10

```
1
12
123
1234
12345
```

11

```
12345
1234
123
12
```

1

```
1
```

12

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

13

```
54321
4321
321
21
1
```

14

```
1
21
321
4321
54321
```

15

```
12345
1234
123
12
1
```

16

```
1 2 3 4 5
 1 2 3 4
  1 2 3
   1 2
    1
```

17

```
    1
  1 2 1
1 2 3 2 1
```

```
  1 2 3 4 3 2 1
1 2 3 4 5 4 3 2 1
```

18

```
1 2 3 4 5 4 3 2 1
  1 2 3 4 3 2 1
    1 2 3 2 1
      1 2 1
        1
```

19

```
    *
  * * *
* * * * *
```

```
  * * * * * * *
* * * * * * * * *
```

20

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

21

```
  1
 1 1
1 2 1
1 3 3 1
```

22

```
A
B B
C CC
D DDD
```

23

```
  A
 A B A
A B C B A
```

```
A B C D C B A
A B C D E D C B A
```

24

```
A B C D E D C B A
 B C D E D C B
  C D E D C
   D E D
    E
```

25

```
1
2 2
3 3 3
4 4 4 4
5 5 5 5 5
```

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

26

```
I
IN
IND
INDI
INDIA
```

```
INDIA
INDI
IND
IN
I
```

27

```
A
BB
CCC
DDDD
```

```
CCC
BB
A
```

28

```
1
2 2
3 3 3
4 4 4 4
5 5 5 5 5
```

29

```
123454321
 2345432
  34543
   454
    5
```

30. 1

```
 21
321
```

```
4321
54321
```

31. 54321

```
 4321
  321
   21
    1
```

32

```
    1
   2 2
  3 3 3
 4 4 4 4
5 5 5 5 5
```

```
 6 6 6 6 6 6
```

33 1

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

```
 1 2 3 4 5
1 2 3 4 5 6
```

34

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*
***
*****
*******
```

```
 *****
  ***
   *
```

35

```
  1
 212
32123
4321234
```

```
 32123
  212
   1
```

36 1

```
 121
12321
1234321
```

```
 12321
  121
   1
```

37 A

```
 ABA
ABCBA
```

```
ABCDCBA
 ABCBA
  ABA
   A
```

38 A

```
 ABA
ABCBA
```

```
ABCDCBA
```

39 ABCDCBA

```
 ABCBA
  ABA
   A
```

```
40     A
   AB
  ABC
 ABCD
ABCDE
 ABCD
  ABC
   AB
    A
41  A
BA
CBA
DCBA
EDCBA
DCBA
CBA
BA
A
42  EDCBA
DCBA
CBA
BA
A
43
 9
0 1
2 3 4
5 6 7 8
9 0 1 2 3
 44
12344321
123__321
12___21
1_____1
 45
       1
      1 2 3
     1 2 3 4 5
    1 2 3 4 5 6 7
  1 2 3 4 5 6 7 8 9
 46
123456654321
1234554321
12344321
123321
1221
11
 47
ABCDEFFEDCBA
ABCDEEDCBA
ABCDDCBA
ABCCBA
ABBA
AA
 48
    1
   222
  33333
 4444444
555555555
 49
```

```
 9
 898
 78987
 6789876
 50
 5
 45
 345
 2345
 12345
 51
 5
 454
 34543
 2345432
 123454321
 52
*********
 *******
  *****
   ***
    *
   ***
  *****
 *******
*********
 53
33333
32223
32123
32223
33333

 54
*
**
* *
*  *
*   *
*    *
*     *
**********

 55
*
***
******
 56
**********
****  ****
***   ***
**    **
*     *
 57
1
3  5  7
9 11 13 15 17 19
58
54321
```

```
5432
543
54
5
59
 1
AB
123
ABCD
12345
 60
     1
    2 3
   4 5 6
  7 8 9 10
61
1 2 3 4 5
 2 3 4 5
  3 4 5
   4 5
    5

62 :
A
BA
ABA
BABA
ABABA

63
*
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***
****
***
**
*
64
1
232
34543
4567654
65
 12321
12 21
1  1
12 21
12321
66
 ABCBA
AB BA
A  A
AB BA
ABCBA
67
 *********
*******
*****
***
*
68
```

```
1234
2341
3412
4123
69
ABCD
BCDA
CDAB
DABC
70
1
121
12321
1234321
123454321
87
 1
2*2
3*3*3
4*4*4*4
4*4*4*4
3*3*3
2*2
1
88
 *000000
0*00000
00*0000
000*000
0000*00
00000*0
000000*
89
 7
 14 15
 28 29 30 31
 56 57 58 59 60 61 62 63
90  #####*#####
####*#*####
###*###*###
##*#####*##
#*#######*#
*#########*
91  543212345
 4321234
  32123
   212
    1
92     5
   454
  34543
 2345432
123454321

93
9
8  6
7  5  3
4  2  0 -2
1 -1 -3 -5 -7
```