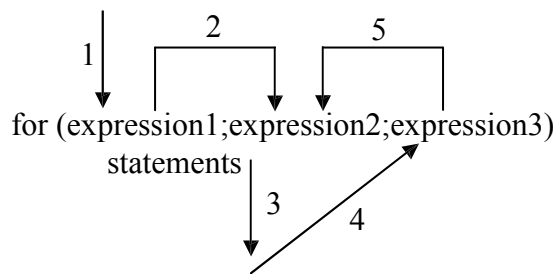# Lecture - 8

Loop: Loops are used in C for repeating some portion of the program either a specified number of times or until a particular condition is being satisfied. There are three methods in C for repeating a part of program.
  i)   Using a for statement
  ii)   Using a while statement
  iii)   Using a do … while statement

for Loop: Syntax of for loop is given below:

Expression1, expression2 and expression3 are normally used for initialization, loop condition and loop counter increment respectively. Expression2 returns a value which may true or false. Any non-zero value means true and zero means false in this case. All three expressions (phase) are optional in for loop.

Example 1:
```
void main()
{
int x ,n ;
printf("Please enter a number ");
scanf("%d",&n);
for (x=1; x<=n; x=x+2)
     printf("%d",x);
}
```

```
Please enter a number 5
135
```

Example 2:
```
void main()
{
int x =1 ;
scanf("%d",&x);
for (x=5; x>=1; x - -)
     printf("%d",x);
}
```

```
54321
```

Example 3:
```
void main() {
int x =1 ;
for (x=5; x - -; )

    printf("%d",x);
}
```

```
43210
```

Example 4:
```
void main()
{
int i ;
for ( i=2; i < = i; i++)
    printf("%d",i);
}
```

```
23456789101112131415
1617.........................
..............................
..............................
..............................
..............................
..............................
..............................
```

Programming will run infinite times in this case. This is called infinite loop. Be careful about infinite loops when programming using loops.
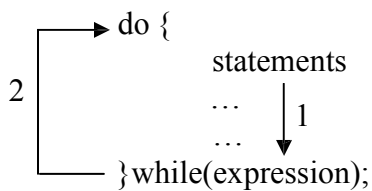
Example 5:
```
void main(void)
{
int x =5 ;
for ( ; x - - ; )
    printf("%d",x);
}
```

```
43210
```

do … while loop: Syntax of do…while loop is given below:

```
    do {
          statements
2         …        1
          …
    }while(expression);
```

Example 1:
```
void main()
{
int x =1 ;
do{
    printf("%d",x);
    x + +;
}while(x < = 3);
}
```
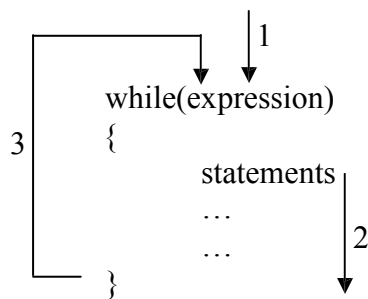
```
123
```

Example 2:

```
void main()
{
int x =3 ;
do{
      printf("%d",x);
}while(x - -);
printf("%d",x);
}
```

```
3210-1
```

while loop: Syntax of while loop is given below:

```
          1
          ↓
 while(expression)
 {
3        statements
         …
              2
         …
 }
```

Example 1:

```
void main()
{
int x =1 ;
while(x < = 3) {

        printf("%d",x);
        x = x+1;
}
}
```

```
123
```

Example 2:

```
void main() {
int x = 5 ;
while(x-2)
{

        printf("%d",x--);
}
}
```

```
543
```