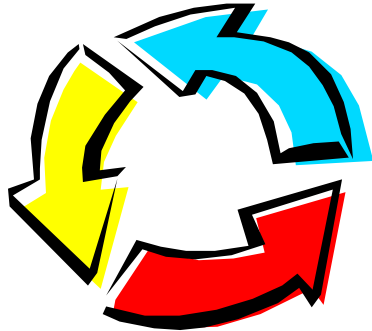


for loops

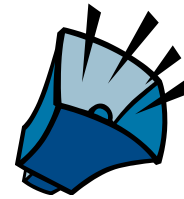




What is a LOOP?

the loop

**Until I can hear the song
Make it louder**



**Loops repeat as long
as something is true**

the loop

**As long as I am hungry
I eat something**



**While I have pretzels
I eat one**

Loop Demonstration

condition



**loop if (student is hungry
and more pretzels left)**

{

**student will eat
1 pretzel stick**

}

Loop Definition

A loop is a tool used to repeat a block of code. As long as the loop condition is true, the block of code associated with the condition is executed.

Loop Demonstration

total = 1

condition

loop if (total < 2)

{

The class will :

1. stand up

2. sit down

total = total + 1

}

block

of

code

total

1

2

Loop Condition

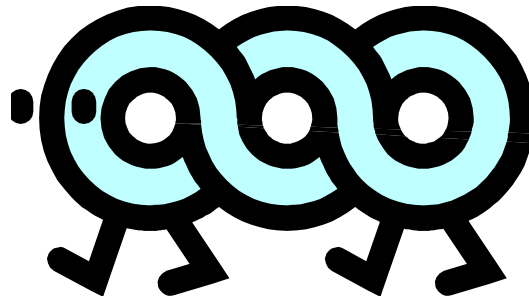
Every loop has a condition that must be true before the loop can run.

total < 2 was the loop condition in the loop demonstration.

The for loop

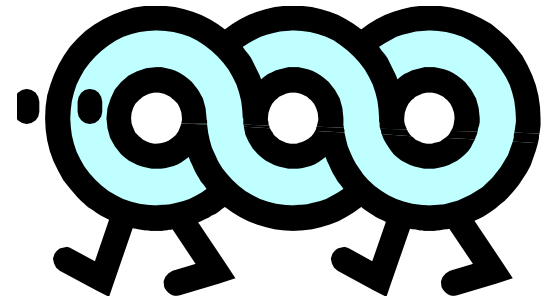
For Loop Definition

A for loop is a block of code associated with a condition. The block of code will run a set number of times depending on the loop condition and increment/decrement value.



the for loop

```
for(init value;  boolean condition placed here;  inc/dec)
{
    do something 1;
    do something 2;
}
```



for loop

start

stop

inc/dec

```
for(int run=1; run<=5; run=run+1)  
{  
    out.println(run);  
}
```

You have to tell the loop where to start, when to stop, and how much to change run.

OUTPUT

1
2
3
4
5

for loop

Some languages use a < start, stop, step > structure with for loops.

start – starting value of the loop

stop – ending value of the loop

step – amount to change the loop variable

**for x = start to stop step y - Visual Basic
 do something
next x**

Start-Initialization

start-0

```
for (int run = 1; //stop-1 ; //inc-3 )  
{  
    //code-2  
}
```

**The start value tells the loop where to start.
run will start with a value of 1.**

Stop-Condition

stop-1

```
for ( //start-0; run<= 5; //inc-3 )  
{  
    //code-2  
}
```

This condition must be true in order for the loop to execute.

Each time through the loop, the condition is evaluated. As long as run is less than or equal to 5, the loop continues.

Step-Inc/Dec

```
                                inc-3
for ( //start-0; //stop-1; run=run+1)
{
    //code-2
}
```

The increment/decrement value tells the loop how much of a change to make to run.

for loop

start

stop

inc

```
for (int run=1; run<=6; run=run+1)  
{  
    out.println(run);  
}
```

How many times does this loop run?

OUTPUT

1
2
3
4
5
6

**Open
for one.java**

for loop 2

```
for(int run=1; run<7; run=run+2)
{
    out.println("loop");
    out.println(run);
}
```

OUTPUT

```
loop
1
loop
3
loop
5
```

for loop 3

```
for(int run=7; run>2; run=run-2)
{
    out.println("loop");
    out.println(run);
}
```

OUTPUT

```
loop
7
loop
5
loop
3
```

for loop

```
for(int bin=1; bin<=32; bin=bin*2)
{
    out.println(bin);
}
```

Why is this
loop a $\log_2 N$
loop?

OUTPUT

1
2
4
8
16
32

**Open
forttwo.java**

**Open
forthree.java**

for loop

```
out.println("cs contests are fun!");  
for(int uil=5; uil>=1; uil--)  
{  
    out.print("state-");  
}  
out.println("\nchamps");
```

OUTPUT

```
cs contests are fun!  
state-state-state-state-state-  
champs
```

**Open
foruill.java**

Open

graphicsrunner.java

randomcoloredboxes.java

sum / total

Many times you will use a loop to total up a run of values.

total = total + run;

total is totaling up all values of run.

sum / total

```
int total = 0;  
for(int run=1; run<6; run++)  
{  
    total=total+run;  
}  
out.println(total);
```

sum / total

```
int total=0;  
for(int x=1; x<6; x++)  
{  
    total=total+x;  
}  
out.println(total);
```

OUTPUT

15

TRACE

<u>x</u>	<u>total</u>	<u>output</u>
	0	
1	1	
2	3	
3	6	
4	10	
5	15	
6		15

**Open
fortotal.java**

Strings and loops

```
String s = "compsci";  
for(int i=0; i<s.length(); i++)  
{  
    out.println(s.charAt(i));  
}
```

OUTPUT

c
o
m
p
s
c
i

new for loop

```
String s = "compsci";  
for(char c : s.toCharArray())  
{  
    out.println(c);  
}
```

OUTPUT

c
o
m
p
s
c
i

Open
forstrings.java
newfor.java

common errors

```
for(int run=0; run>5; run++)  
{  
    //do something  
}
```



common errors

```
For(int run=0; run<5; run++)
```

```
{
```

```
}
```

```
for(int run=0; run<5; run++);
```

```
{
```

```
}
```



{ and ; rule

Never put a ;
before an open { brace

:{

illegal

};

legal



**Start work
on the labs**