A+ Computer Science

FOR LOOPS

The Loop

**Until I can hear the song
Make it louder**
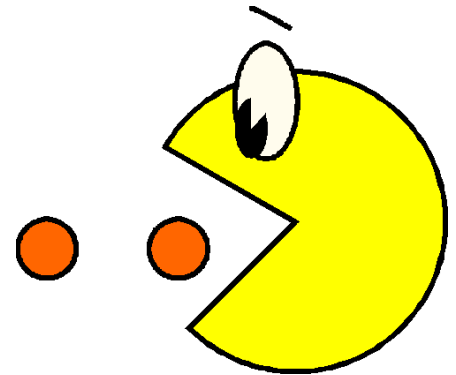
**Loops repeat as long
as something is true**

The Loop

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

**While I have stuff to eat
I eat some stuff**

The Loop

condition

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

student will eat another pretzel

}

The Loop

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.

The
For
Loop

The For Loop

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;
}
```

The For Loop

start   stop   inc/dec

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

OUTPUT

1
2
3
4
5

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

A+ Computer Science
www.apluscompsci.com

The 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

The For Loop

```
          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.

The For Loop

```
                              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.

The For Loop

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.

The 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

Computer Science
www.apluscompsci.com

For Loop Fun

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

OUTPUT
1
2
3
4
5
6

Why does this work?

forone.java

The For Loop

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

```
OUTPUT
comp
1
comp
3
comp
5
```

The For Loop

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

OUTPUT
aplus
7
aplus
5
aplus
3

The 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

fortwo.java
forthree.java

graphicsrunner.java
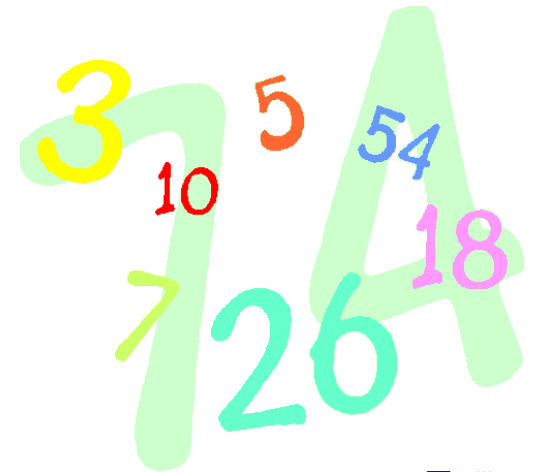# randomcoloredboxes.java

Loop Summing

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.

Loop Summing

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

Loop Summing

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

OUTPUT

15

TRACE

x	total	output
	0	
1	1	
2	3	
3	6	
4	10	
5	15	
6		15

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

Strings and Loops

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

OUTPUT
c
o
m
p
s
c
i

Strings and Loops

```
String s = "compsci";
for(int i=0; i<s.length(); i++)
{
    out.println(s.substring(i,i+1));
}
```

OUTPUT

c
o
m
p
s
c
i

forstrings.java
foreach.java

Strings Algorithms

```
String s = some value
for(int i=0; i<s.length(); i++)
{
    if( current letter matches x )
        count = count + 1
}
```

Sometimes, you need to iterate through a String to check for values or to see if certain criteria have been met.

stringsearch.java

For A While

While Loop

```java
int fun = 1;
int total = 0;
while( fun <= 5 )
{
    total = total + fun;
    fun = fun + 1;
}
System.out.println(total);
```

OUTPUT
15

For (while) Loop

```java
int run = 1;
int total = 0;
for(  ; run <= 5;  )
{
        total = total + run;
        run = run + 1;
}
System.out.println(total);
```

OUTPUT
15

forfun.java

For; loop ERRORS

Common Loop Errors

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

Common Loop Errors

For(int run=0; run<5; run++)
{
}

for(int run=0; run<5; run++)**;**
{
}

Common Loop Errors

Never put a ;
before an open { brace

;{   **illegal**

};   **legal**

Work on Programs!

Crank Some Code!