

for loops



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Lab 08

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.



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the for loop

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



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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

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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

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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.

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Stop-Condition

```
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.

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Step-Inc/Dec

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

inc-3

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

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for loop

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

start stop inc

How many times does this loop run?

OUTPUT
1
2
3
4
5
6

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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

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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

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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

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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-
champs
```

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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.

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sum / total

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

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sum / total

```
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

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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

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common errors

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

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

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

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