

Humna Sultan
Mr. Hendricks
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10/12-10/16: R6.1-R6.6, R6.8, R6.11

R6.1

- While loops
 - Perform the function body while a certain condition is true
- Do while loops
 - Similar to while loops, but the condition is checked after the first iteration instead of before
- For loop
 - Function that performs the function body x times based on iteration and a condition provided (EX: `int i = 0; i <= 5`)

R6.2

0000000000
0123456789
0246802468
0369258147
0482604826
0505050505
0628406284
0741852963
0864208642
0987654321

R6.3

- a. 10 times
- b. 10 times
- c. 10 times
- d. 21 times
- e. Infinite
- f. 11 times
- g. 7 times

R6.4

```
int i = 1;  
int s = 0;
```

```
while (i <= 10)
{
    s = s + i;
    i++;
}
```

R6.5

```
int n = 1;
double s = 1.0 / (n*n);
double x = 0 + s;
n++;
while (s > 0.01)
{
    s = 1.0 / (n*n);
    x = x + s;
    n++;
}
```

R6.6

An infinite loop is a loop with a body that performs infinitely many times due to an error in the iteration setup for the loop. You can stop or terminate the loop by stopping the program; afterwards, you can debug, find the issue, and fix the loop.

R6.8

```
int i = 0;
int j = 0;
do
{
    System.out.println("Enter a value between 1 and 10 :: ");
    j = in.nextInt();
    i++;
}
while (i <= 2 && j >= 1 && j <= 10);
```

R6.11

An off by one error is when you intend to perform a function n times, but the function actually performs $n - 1$ or $n + 1$ times.

EX:

You want the function to perform 5 times, but you do this:

`for(int n = 0; n <= 5; n++)` << this would perform 6 times