

Northeastern Illinois University
CS303A, Object-Oriented Programming and Data Structures
Homework: Time Complexity

For each problem below, find the time complexity/running time in terms of N:
Type your answers in a word file then convert it to a PDF file in the following
format:

Problem x: $O(N^2)$ where x is the problem number.

Problem y: $O(N^3)$ where y is the problem number.

Problem 1:

```
for(int i = 1; i <= n; i++)
{
    k = k * 5;
}
```

Problem 2:

```
for(int i = 1; i <= n; i++)
{
    for(int j = 1; j <= n; j++)
    {
        System.out.println(i * j);
    }
}
```

Problem 3:

```
for(int i = 1; i <= 5; i++)
{
    k = k + i;
}
```

Problem 4:

```
for(int i = 1; i <= n; i++)
{
    for(int j = 1; j <= 5; j++)
    {
        System.out.println(i);
    }
}
```

Problem 5:

```
public static void show(int n)
{
    int k = 1;
    while(k < n)
    {
        System.out.println(k);
        k = k * 2;
    }
}
```

Problem 6:

```
public static boolean hide(int[] array)
{
    for(int i = 0; i < array.length; i++)
    {
        for(int j = i + 1; j < array.length; j++)
        {
            if(array[i] == array[j])
            {
                return true;
            }
            else
            {
                return false;
            }
        }
    }

    return true;
}
```

General Instructions:

- No hard copies will be collected.
- Do not send your files through the email!
- You should submit your work by the due date, **No** extensions will be given. (See syllabus for late homework policy).
- **DO NOT** turn in multiple files, only one .zip file.

What to turn in:

There should be one **.PDF** file, put this file into a zip file and name it <YourFirstName_YourLastName>.zip, submit the zip file into the Dropbox on D2L.

How to zip multiple files?

On Windows: Select all the files > right click > Send to > Compressed File

On Mac: Select all the files > Click/Tap with two fingers > Compress Items