

## ASSIGNMENT 2A

Assignment 2A tests your understanding of program complexity on different solutions to the same problem.

**Part 1.** Design a Java **driver class** (called **YourNameAssignment2A**; replace **YourName** with your actual name), with the following **3 methods** (use the exact/precise names, spelling, caps, parameters, returned values, functionality) that compute the Nth element of the series  $1+2^2+3^2+\dots N^2$ , representing the sum of the squares of the first **N** positive integers, using 3 different programming algorithm (replace **YourName** with your actual name):

Method	Description
<b><u>YourNameMethod1</u></b>	A recursive method with parameter <b>N</b> that uses recursion to compute $1+2^2+3^2+\dots N^2$ .
<b><u>YourNameMethod2</u></b>	A brute method with parameter <b>N</b> that uses a loop to compute $1+2^2+3^2+\dots N^2$
<b><u>YourNameMethod3</u></b>	A mathematical method with parameter <b>N</b> that uses mathematic summation formula <sup>1</sup> to compute $1+2^2+3^2+\dots N^2$

The methods should return 0 if the parameter N is not a positive integer. Use your 3 methods in the **main** method for 3 different values for parameter N.

**Part 2. Implement the class in NetBeans IDE and JAVA:** Create a JAVA project called **YourNameAssignment2A** (same name as the driver class) and add your code to **YourNameAssignment2A** project/driver class. Your program should be **user-friendly** and be **well-documented/commented** (have comments for every line of code).

**Part 3. Create the screenshot document for your code and output:** Create a Microsoft Word document from the **YourName-Assignment2A.docx** template and call it **YourName-Assignment2A.docx** (replace **YourName** with your actual name) Add to the document your **complete screenshots** of the NetBeans editor window showing the **complete JAVA source code** for **YourNameAssignment2A** class and **complete screenshots the complete output**. If the entire class JAVA source code or the output does not fit in one screenshot or the screenshots cannot be easily read, create multiple screenshots and add multiple screenshots to the screenshot document. Please keep the screenshots in order (look at the line numbers). If your output is longer than a line and does not fit on one screen, Wrap Text in your output panel..

**Part 4.** Compute the complexity of each of the 3 methods/algorithms using the Big O notation. In the **YourName-Assignment2A.docx** document in the COMPLEXITY section and in the table below the exact **Complexity in Big O Notation** for each of your 3 methods and the Big O notation calculations/explanations for the method complexity for each one of the 3 methods (replace **YourName** with your actual name):

Method	Complexity in Big O Notation	Explanations
<b><u>YourNameMethod1</u></b>		
<b><u>YourNameMethod2</u></b>		
<b><u>YourNameMethod3</u></b>		
<b>Best Method</b>		

The **Explanations** column add details on how you computed the Big-O notation complexity for the Method, and, for the **Best Method** row, explain why you selected that particular method as Best Method as Complexity in Big-O Notation.

**Part 5. Submit your work:** Submit **YourName-Assignment2A.docx** on eCampus under the **Assignment 2A**. Do not archive the files (e.g. no RAR, ZIP, etc.) or submit other types/formats of files (e.g. no CLASS, PDF, JAVA, etc.). Please take time after submitting to review the file and check it is correct and resubmit it if there are any errors.

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<sup>1</sup> Look at this website to find the formula and, if interested, to see how it is computed <https://brilliant.org/wiki/sum-of-n-n2-or-n3/>