**IT629 - Introduction to Algorithm**

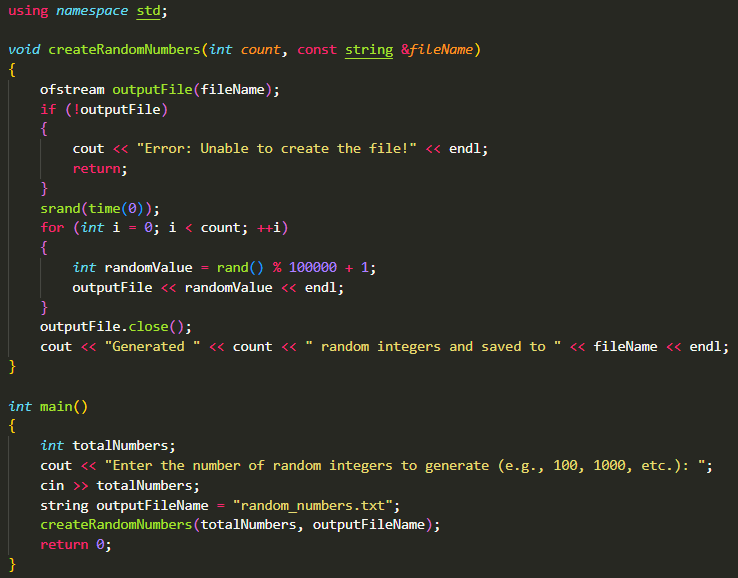
Assignment - 1

**Name : Patel Mahek Vishalkumar**

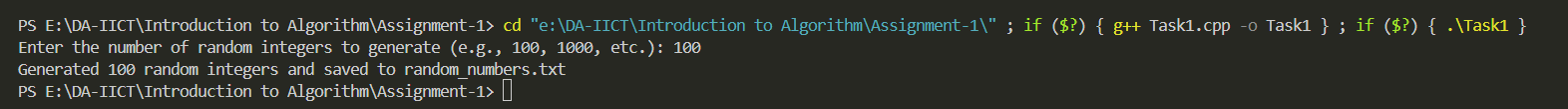
**Student ID : 202412068**

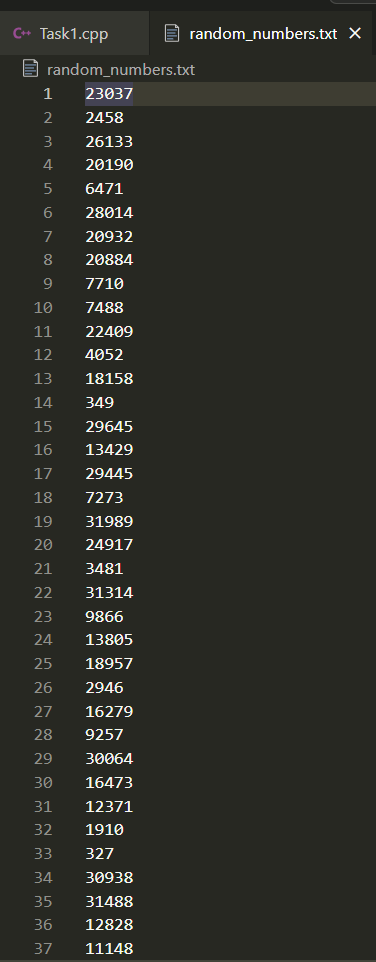
**1.** Use the random number generator to generate a sequence of N random integers, where N can have value 100, 1000, 2000, 5000 ... 100000 ... etc.

**Code :**

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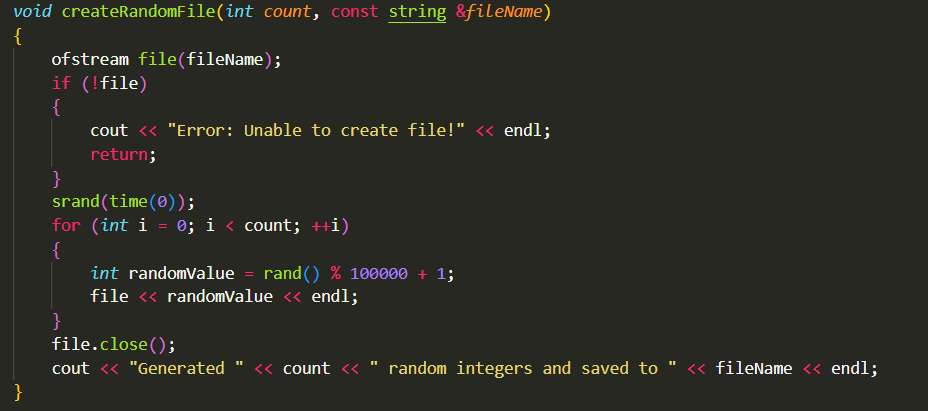
**Output :**

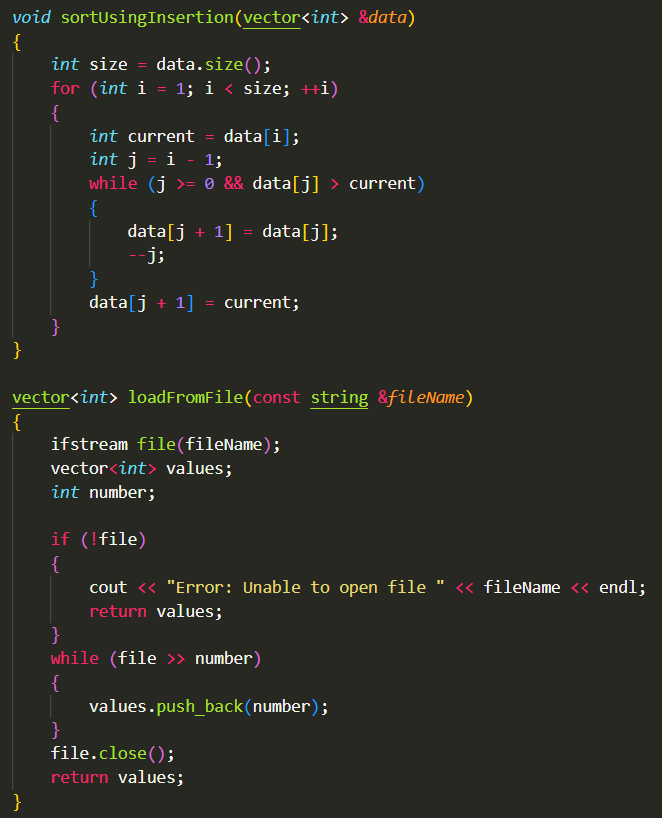
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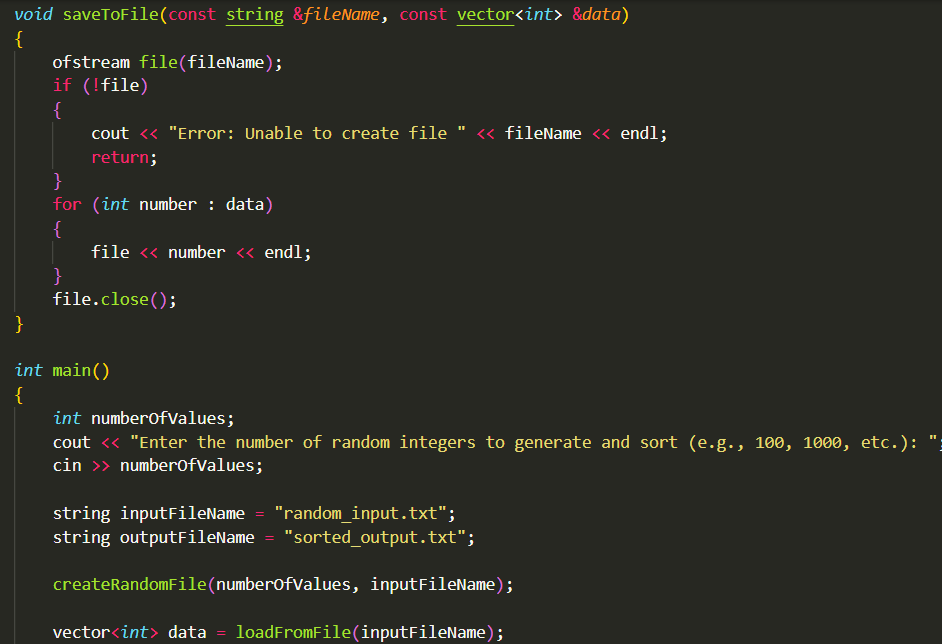
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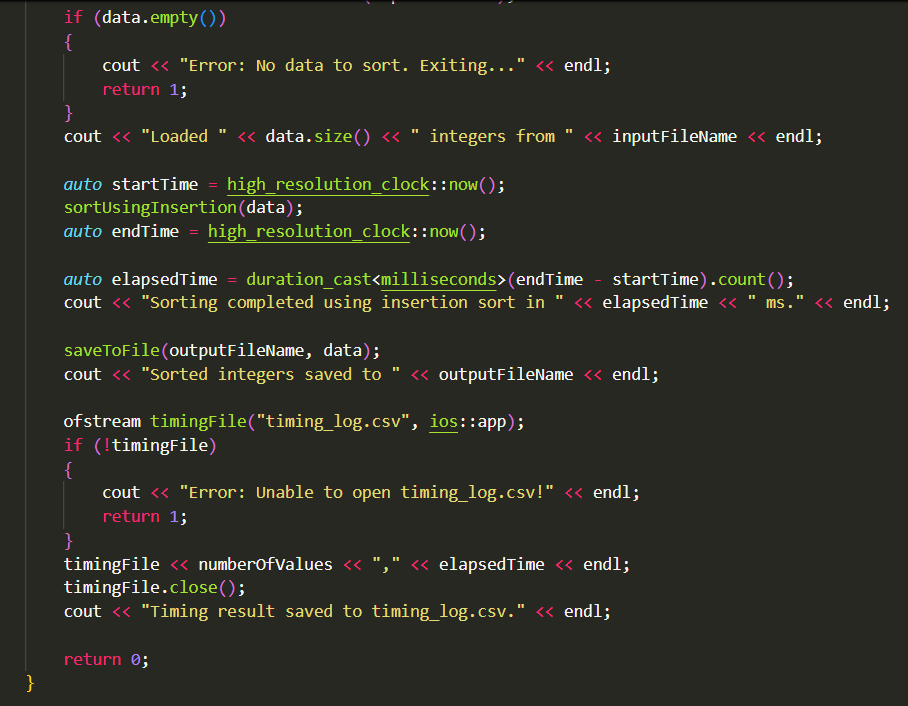
**2.** Program the insertion sort algorithm to sort N integers. Input and output are both in the form of txt files. Test the algorithm for small N.

**Code :**

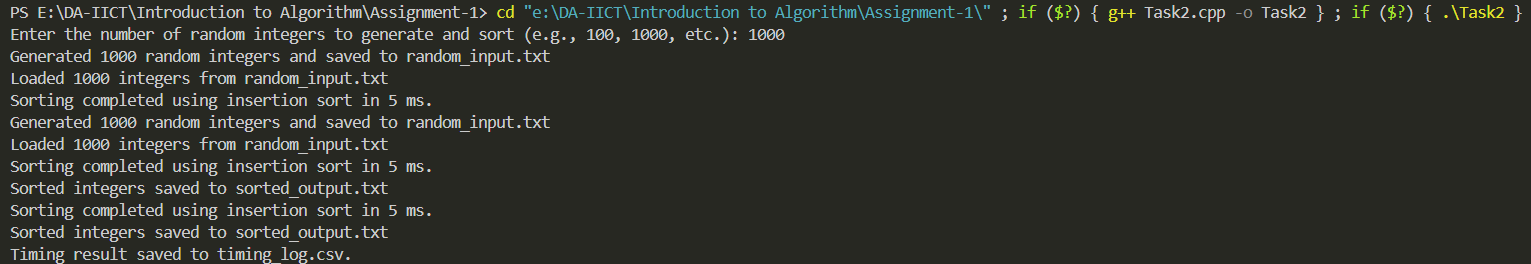
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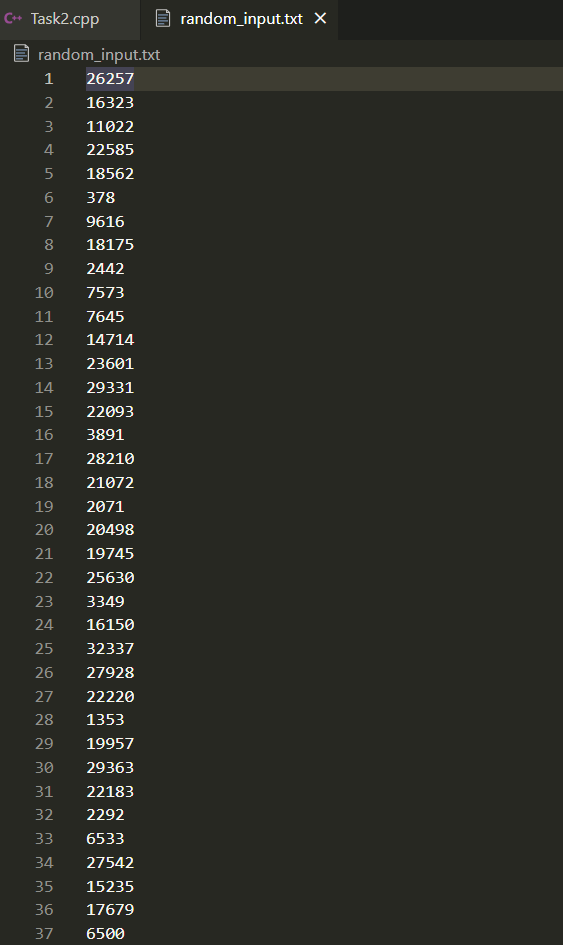
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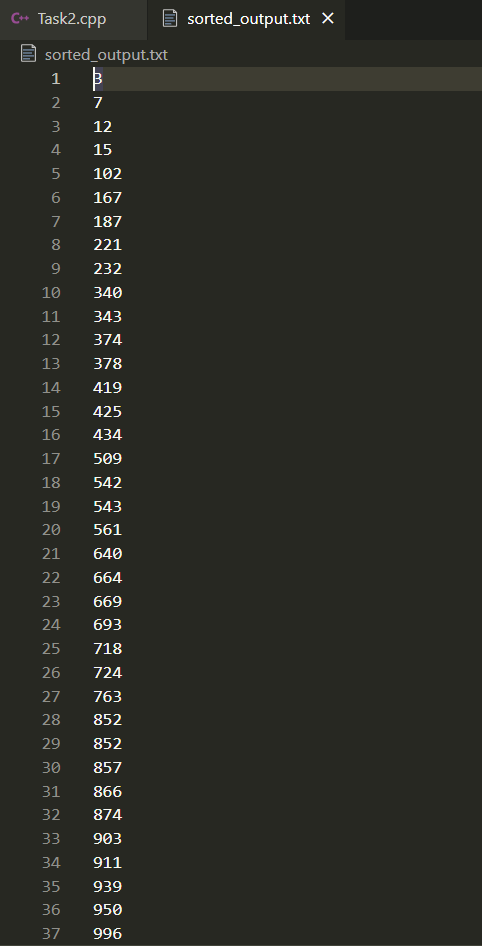
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**Output:**

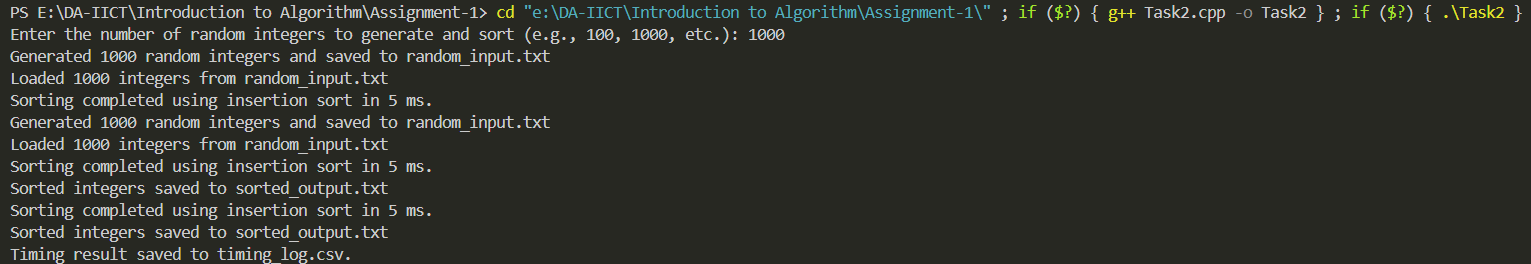
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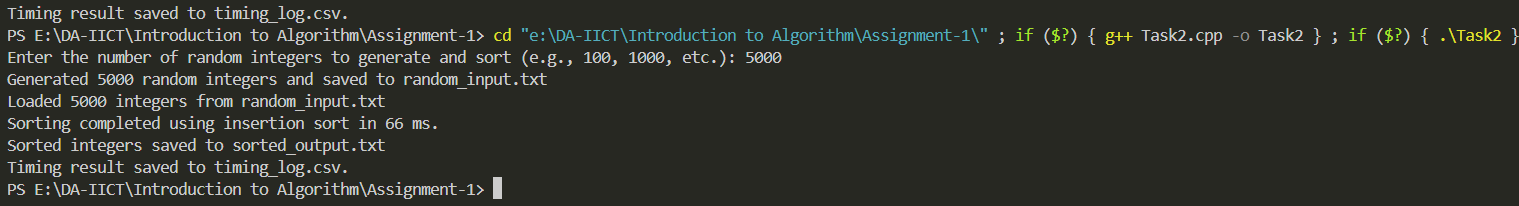
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**3.** Measure the running time of the algorithm, and plot it as a function of N. Verify that the running time grows as N^2.

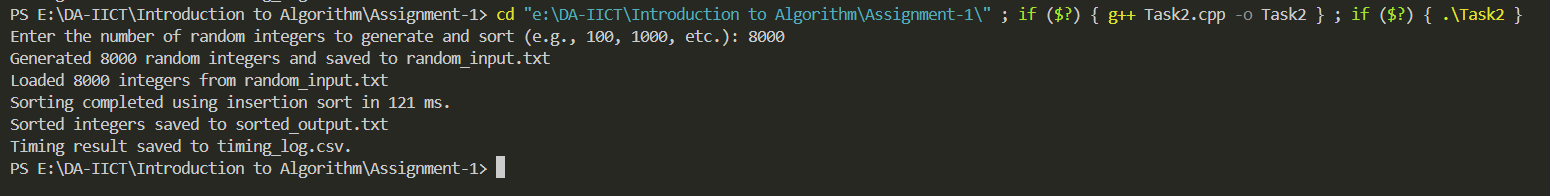
**Output 1:**

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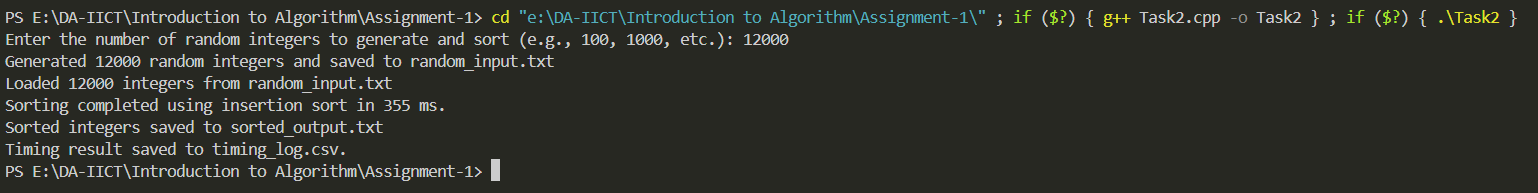
**Output 2:**

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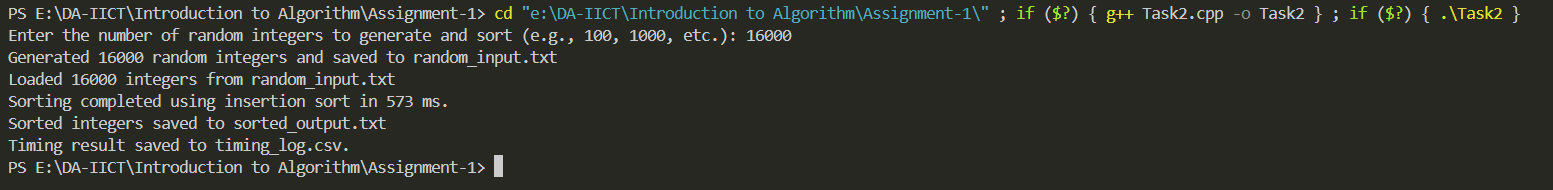
**Output 3:**

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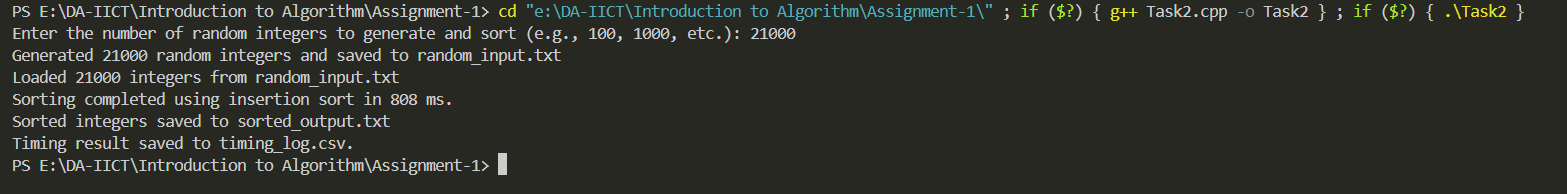
**Output 4:**

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**Output 5:**

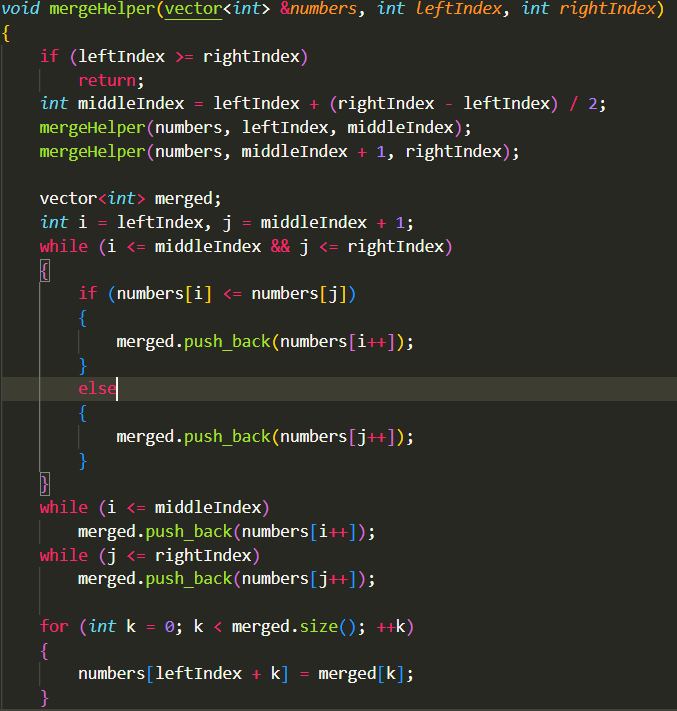
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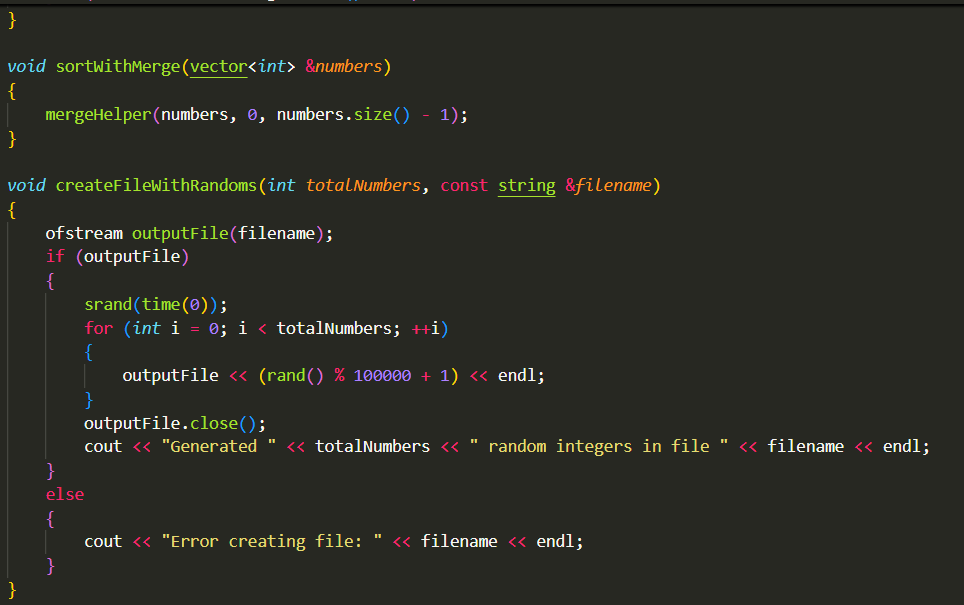
**Output 6:**

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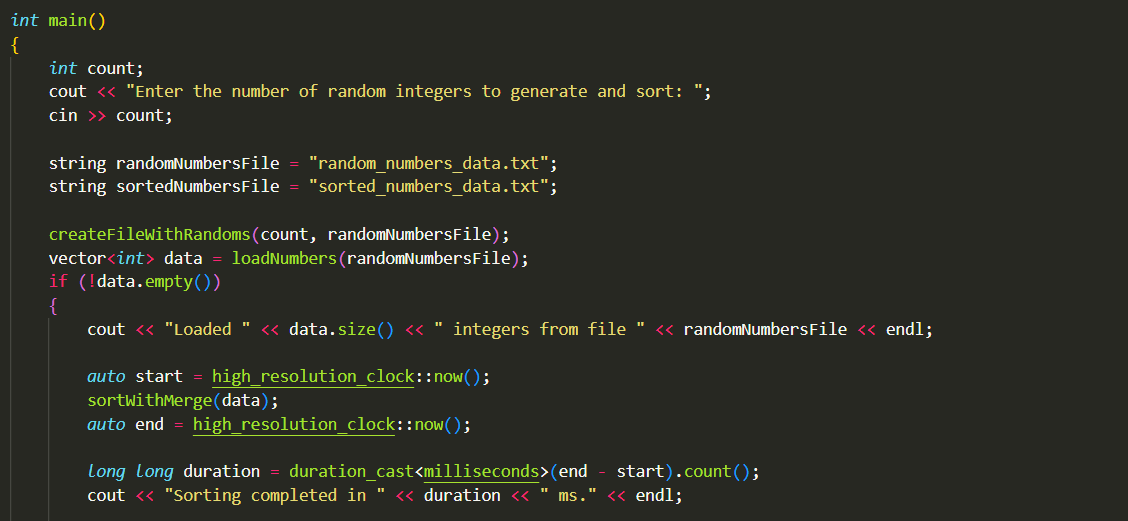
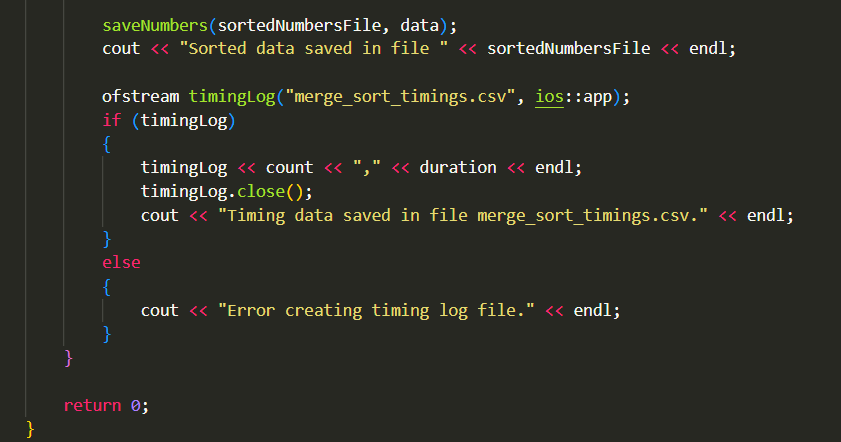
**4.** Repeat steps 2 and 3 with the merge-sort algorithm. Plot and verify that the running time grows as N\*log(N).

**Code :**

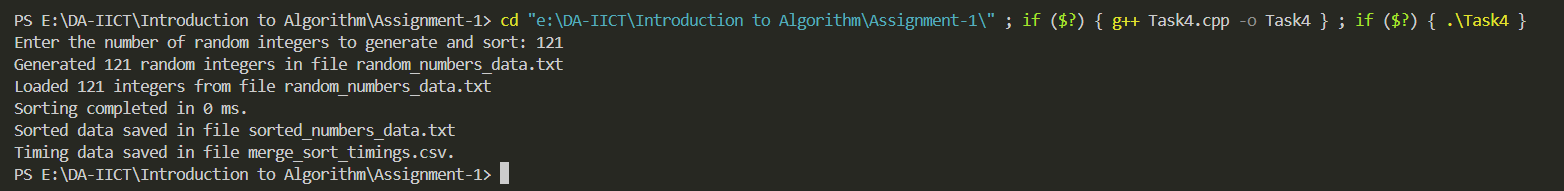
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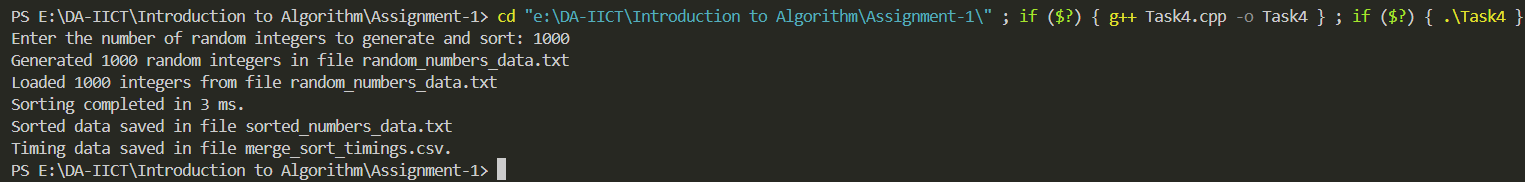
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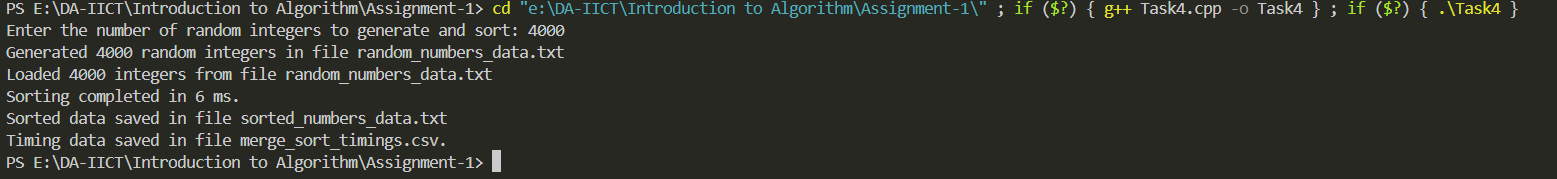
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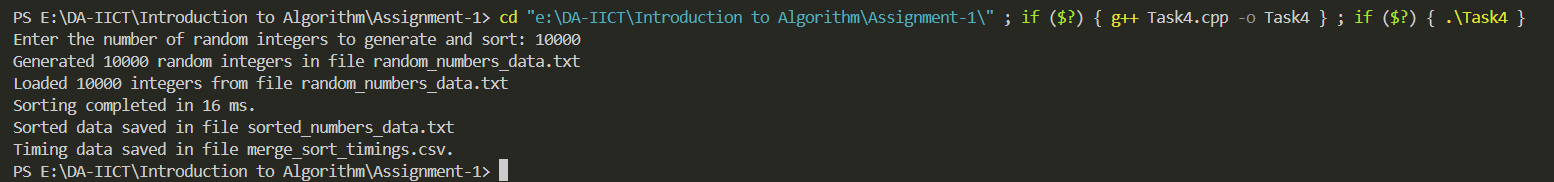
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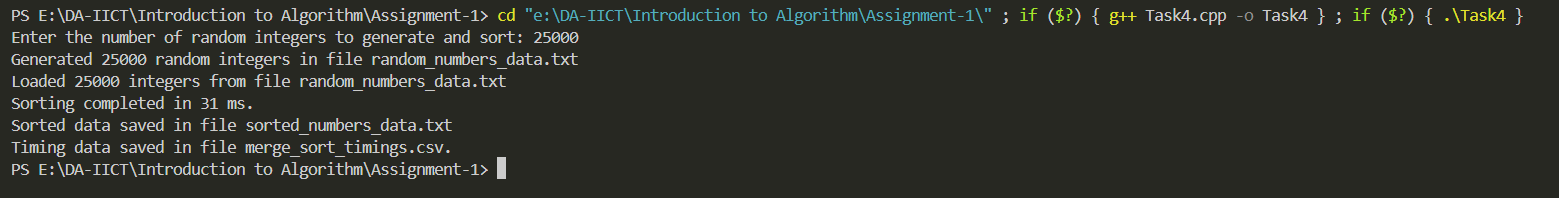
**Outputs :**

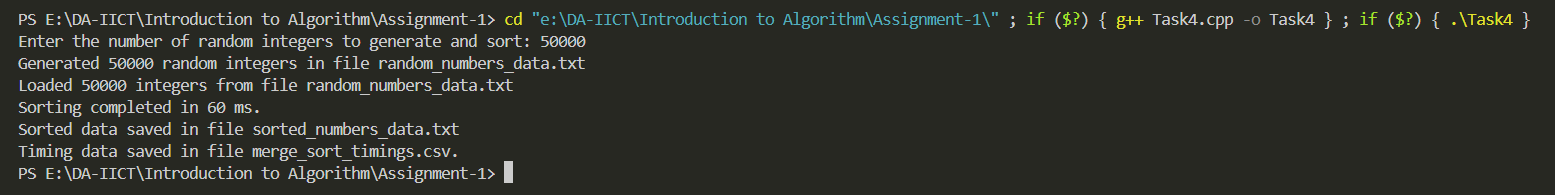
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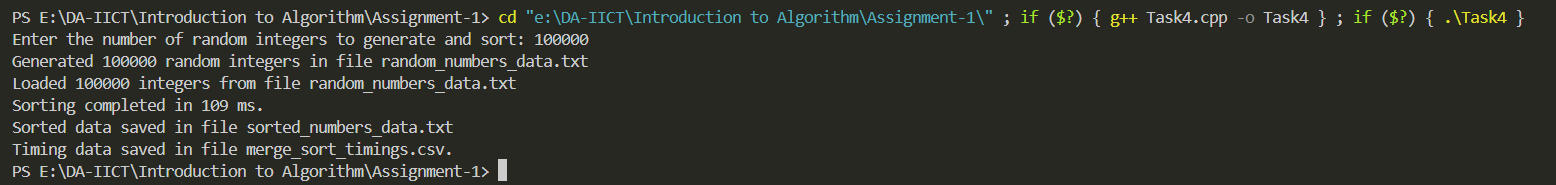
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**5.** Compare the two plots. Do they cross?

Shown the comparison graph of both the algorithms with different scaling on Y axis for better visualization.

