**Program Structures & Algorithms**

**Spring 2022**

**Assignment No. 3**

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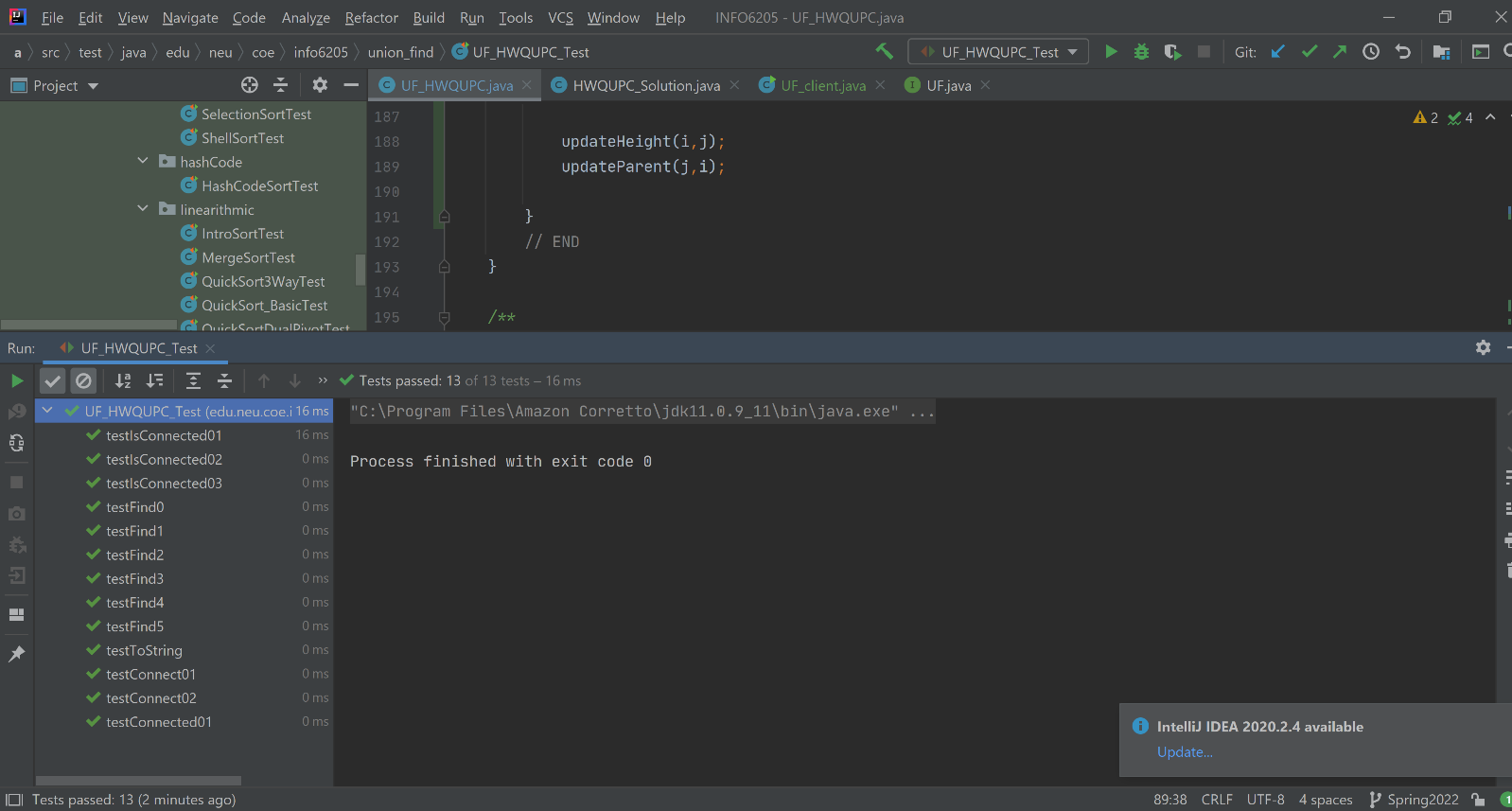
NUID: 001520806

Section: 8

**Task:**

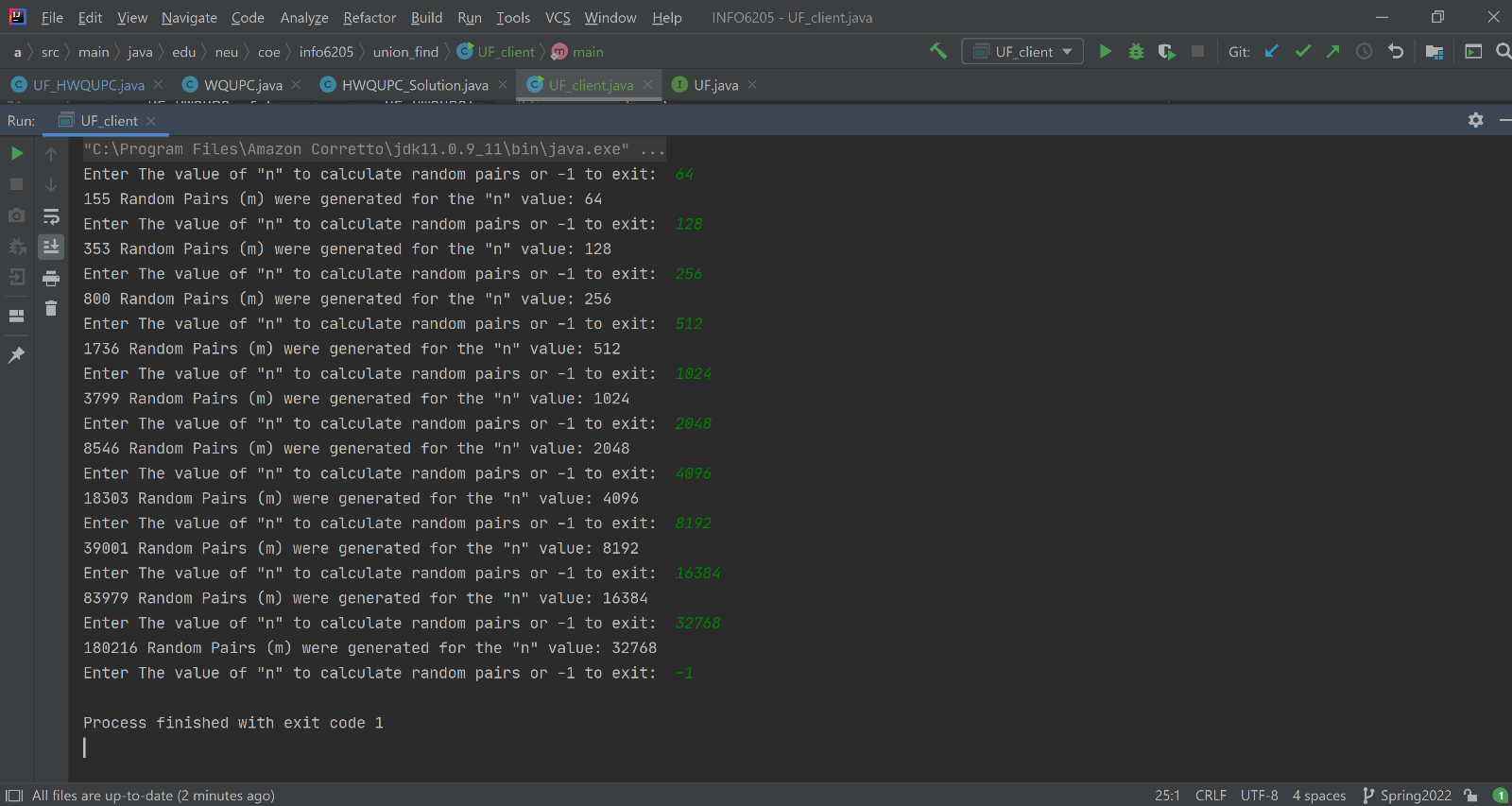
**1)** To Implement height-weighted Quick Union with Path Compression by filling the missing code in the class UF\_HWQUPC.java

**Unit Test Screenshot:**

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**2)** To develop a UF ("union-find") client that takes an integer value n from the command line to determine the number of "sites." Which then generates random pairs of integers between 0 and n-1, calling connected () to determine if they are connected and union () if not. This is implemented in the UF\_client.java file.

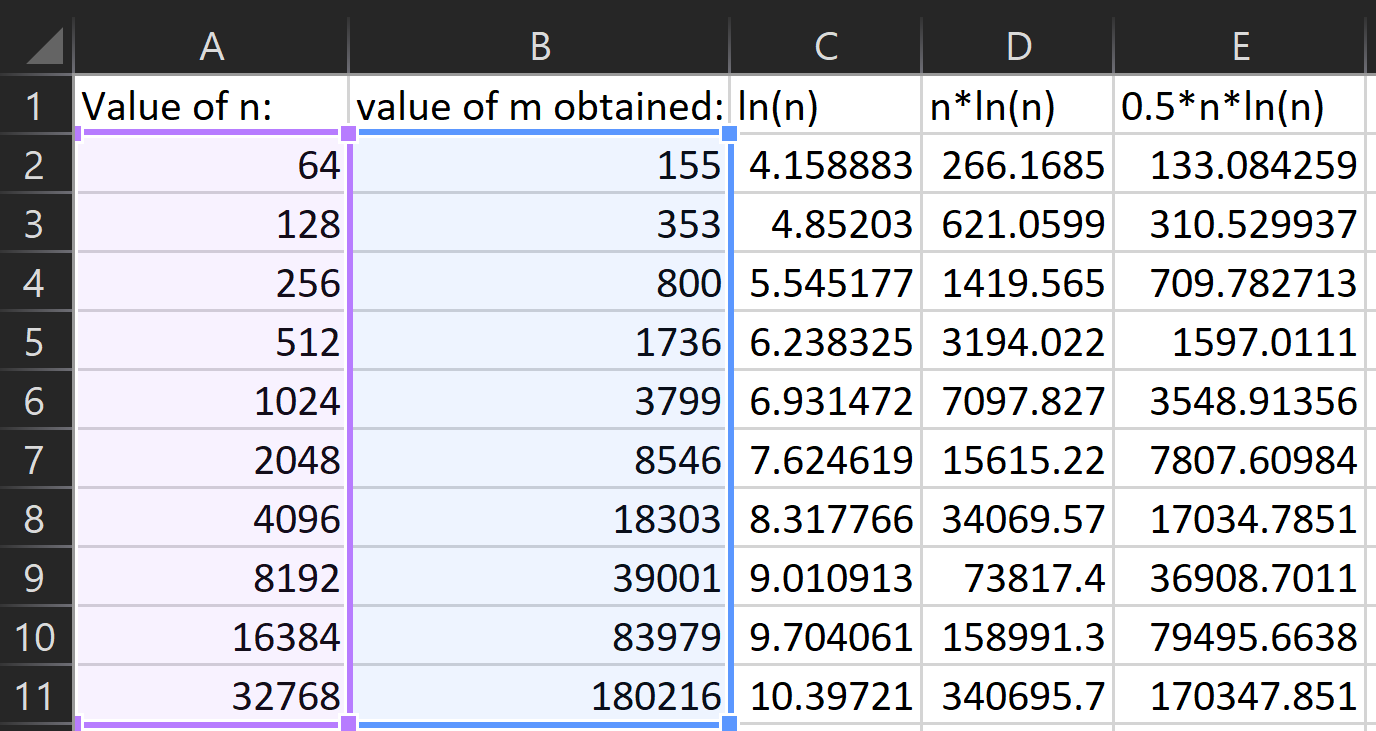
**Output Screenshot:**

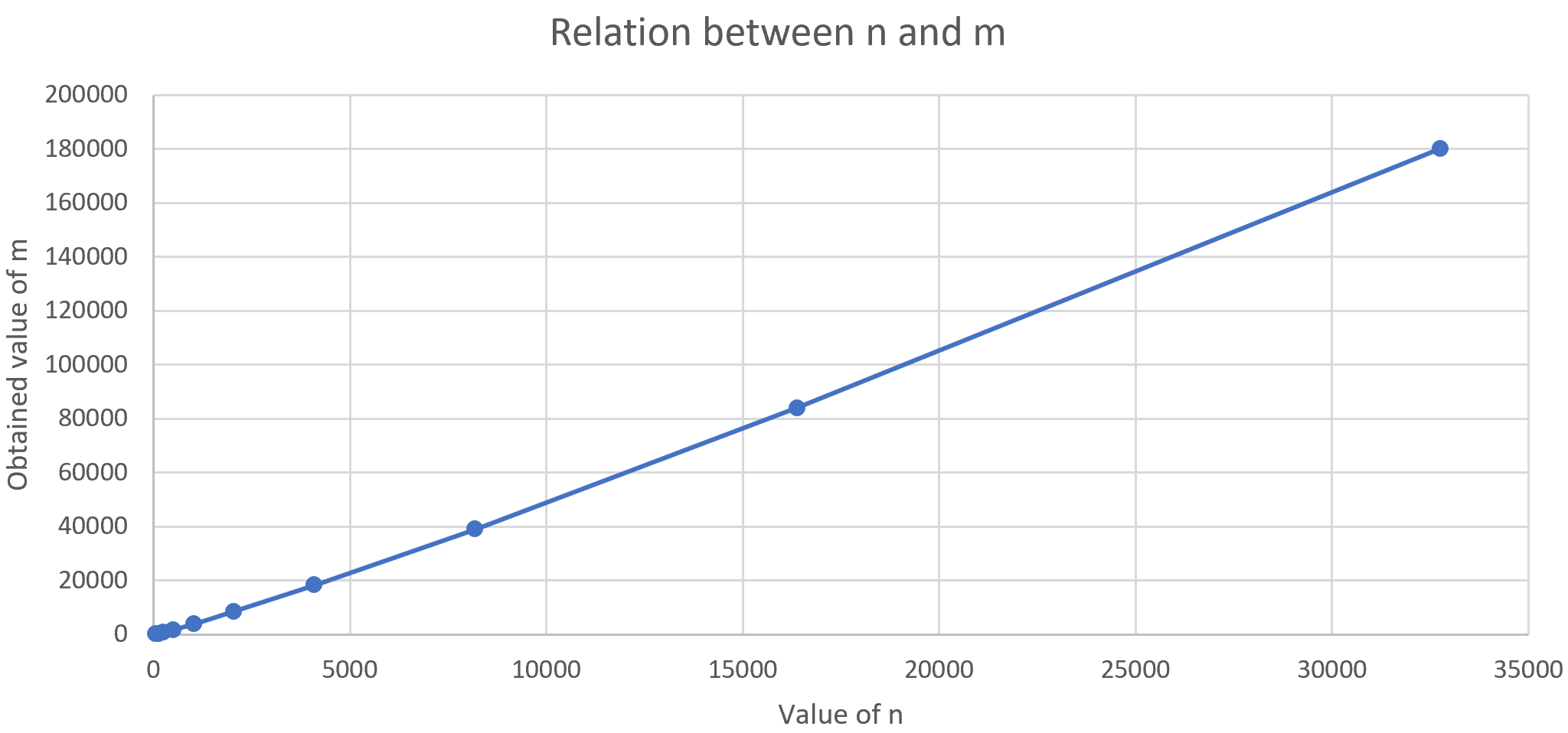
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**3)** Relationship between **m** and **n:**

m ≈ 0.5 \* n \* ln(n)

**Evidence and Graph:**

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**Conclusion:**

* As Evidentfrom the graph, we see that the relationship between n and m is almost linear in nature when n increase by twice, the value of m becomes almost twice.