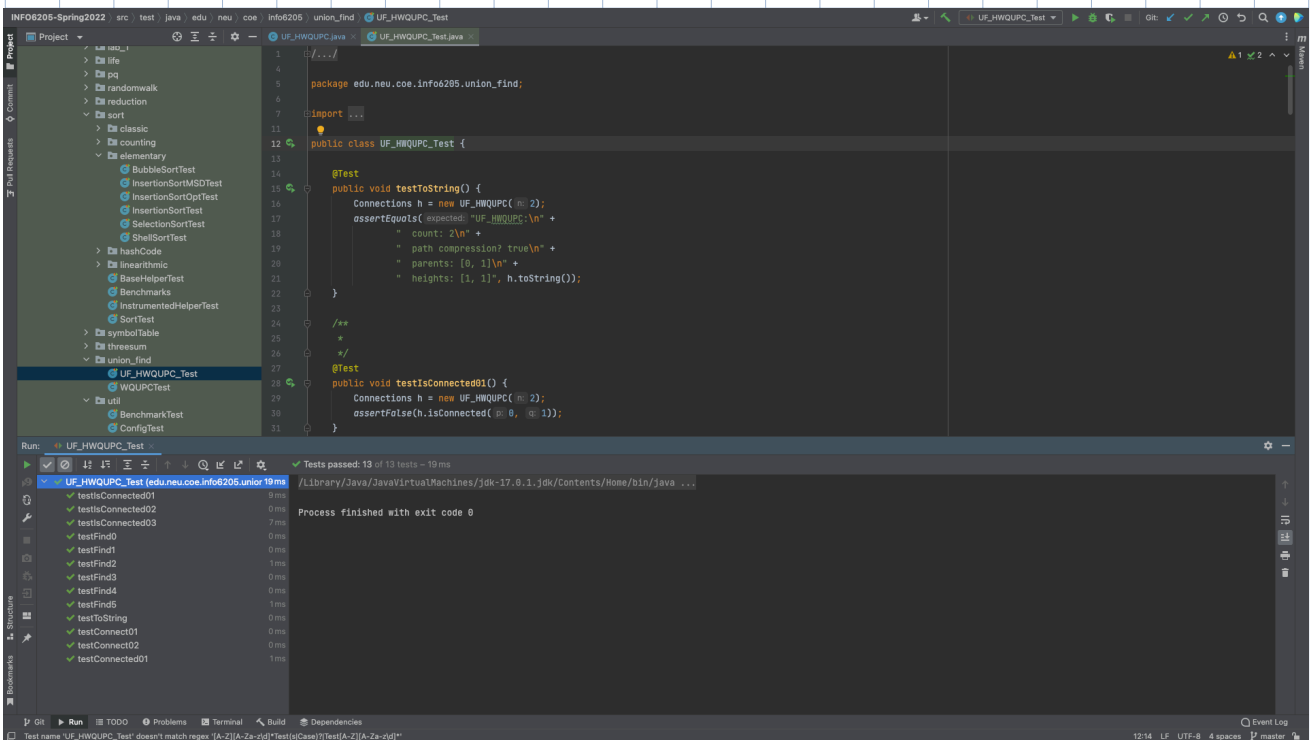
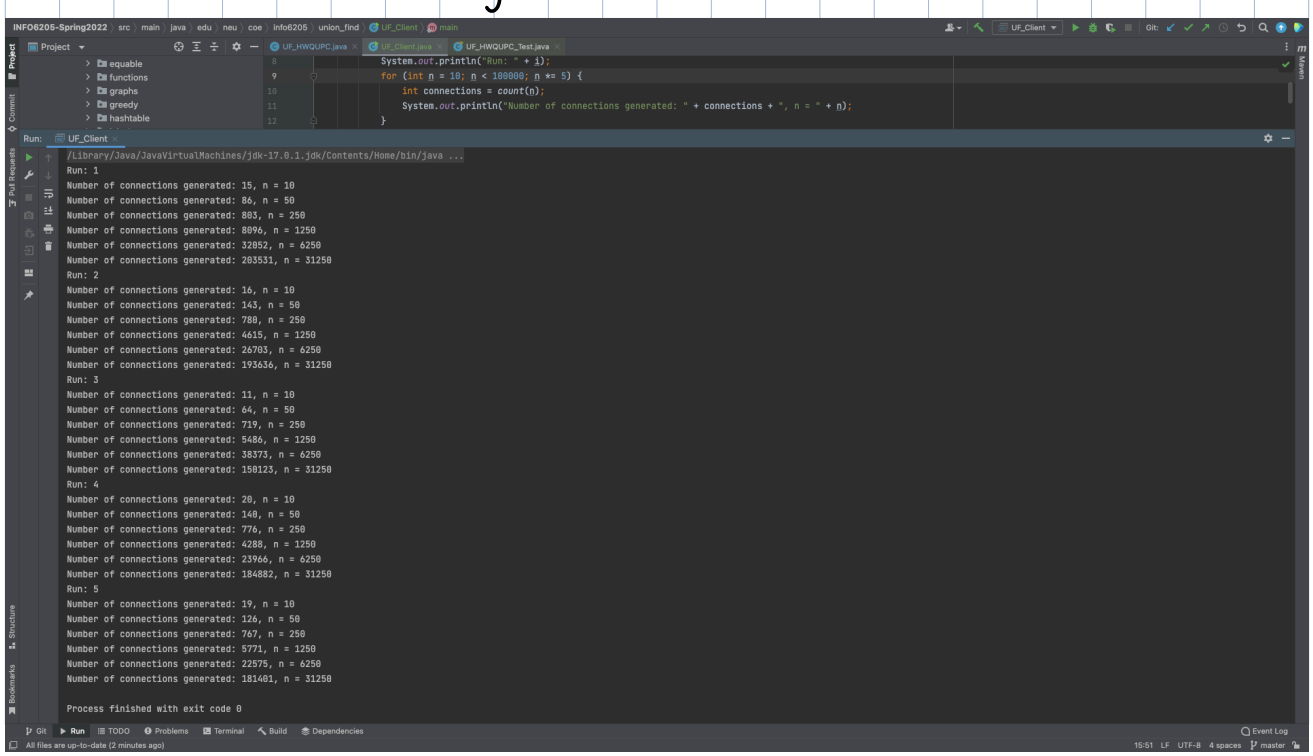
Part 1



Part 2

See UF_Client.java under the union_find folder



Part 3.

Number of Connections (m)					Average m	lg n	lg m
Run 1	Run 2	Run 3	Run 4	Run 5			
15	16	11	20	19	16.2	3.32192809	4.01792191
86	143	64	140	126	111.8	5.64385619	6.80477638
803	780	719	776	767	769	7.96578428	9.58683979
8096	4615	5486	4288	5771	5651.2	10.2877124	12.4643415
32052	26703	38373	23966	22575	28733.8	12.6096405	14.8104612
203531	193636	150123	184882	181401	182714.6	14.9315686	17.4792324

From the above data we can see that $\lg m$ and $\lg n$ has a linear relationship, while $\lg m \approx 1.2 \lg n$