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METCS 526

Module 5 Homework (Problems 1 through 6)

**Problem 1 (10 points)**

**Text, letter

Description automatically generated**

**Problem 2 (10 points).**

**Diagram, letter

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**Problems 3 (10 points each).**

**Diagram

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**Problem 4 (10 points).**

**Diagram

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**Problem 5 (10 points).**

**Diagram

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**Problem 6 (10 points).**

World Series Problem solution for P(4,1) and P(2,4).

P(4,1): = (P(3,1)+P(4,0))/2 = (1/8 + 0)/2 = 1/16

P(2,4) = (P(1,4)+P(2,3))/2 = (15/16 + 11/16)/2 = 26/32.

**Problem 7 (10 points).**

**Graphical user interface, chart, line chart

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I ran the program several times, specifically to confirm some of my observations, with various sizes – going as high as sorting 1 million integers.

One thing that I observed almost instantly was that insertion sort scaled upwards in runtime the fastest by far, and the other three all roughly scaled together. However, despite runtimes not increasing heavily with these smaller Ns, merge, quick, and heapsorts all definitely increased with N as well.