East West University
Department of Computer Science and Engineering

CSE106 Discrete Mathematics
Mini-Project

CO: CO3, CO4
Cognitive Learning Level: C3
Psychomotor Learning Level: P3
Affective Learning Level: A2

Mini Project 1 (for odd group number)

1. Using C program, randomly generate an **undirected graph** represented by adjacency matrix with $n = 1000$ vertices.
2. Determine number of edges in the graph. Determine degrees of all vertices. Show that the Handshaking logic holds. Determine computational time in this step in ms.
3. Repeat steps 1 and 2 for $n = 2000$, $n = 3000$, $n = 4000$, and $n = 5000$.
4. Using Microsoft Excel Worksheet, draw a line graph showing computational time vs. n. In the line graph, select Add Trendline. In the Trendline Options, select Polynomial. Select the Order value that mostly matches your graph. Then select Display Equation on Chart. From the displayed equation, determine the time complexity of your program as a function of n.
5. Theoretically determine the computational time complexity of your program as a function of n and compare that with the time complexity found in step 4.
6. Give a 5-minute power point presentation on your mini project on the specified date and time. In the presentation, mostly address (i) your C code, (ii) theoretical time complexity determination from C code, (iii) practical time complexity determination from run-time data, and (iv) comparison of theoretical and practical time complexities. **This will be a group presentation.**
7. Submit a two-page report containing compact information on (i) your C code, (ii) theoretical time complexity determination from C code, (iii) practical time complexity determination from run-time data, and (iv) comparison of theoretical and practical time complexities. **This will be a single submission from a group.**

Notes:

1. **Submit softcopy of the report by email to my GTA on the day before the presentation date.**
2. **Each group will consist of 4 students.**
3. **Your C code should be within the scope of the content taught in CSE103 course.**

Mini Project 2 (for even group number)

1. Using C program, randomly generate a **directed graph** represented by adjacency matrix with $n = 1000$ vertices.
2. Determine in-degrees and out-degrees of all vertices and show that sum of in-degrees and sum of out-degrees are equal. Determine computational time in this step in ms.
3. Repeat steps 1 and 2 for $n = 2000$, $n = 3000$, $n = 4000$, and $n = 5000$.
4. Using Microsoft Excel Worksheet, draw a line graph showing computational time vs. n. In the line graph, select Add Trendline. In the Trendline Options, select Polynomial. Select the Order value that mostly matches your graph. Then select Display Equation on Chart. From the displayed equation, determine the time complexity of your program as a function of n.
5. Theoretically determine the computational time complexity of your program as a function of n and compare that with the time complexity found in step 4.
6. Give a 5-minute power point presentation on your mini project on the specified date and time. In the presentation, mostly address (i) your C code, (ii) theoretical time complexity determination from C code, (iii) practical time complexity determination from run-time data, and (iv) comparison of theoretical and practical time complexities. **This will be a group presentation.**
7. Submit a two-page report containing compact information on (i) your C code, (ii) theoretical time complexity determination from C code, (iii) practical time complexity determination from run-time data, and (iv) comparison of theoretical and practical time complexities. **This will be a single submission from a group**

Notes:

4. **Submit softcopy of the report by email to my GTA on the day before the presentation date.**
5. **Each group will consist of 4 students.**
6. **Your C code should be within the scope of the content taught in CSE103 course.**

Mark Distribution:

1.	Program accuracy and quality (Cognitive: C3):	3.0
2.	Report quality (Cognitive: C3):	1.0
3.	Report quality (Psychomotor – communication skill: P3):	1.0
4.	Presentation quality (Cognitive: C3):	3.0
5.	Presentation quality (Psychomotor – communication skill: P3):	1.0
6.	Presentation quality & Question-answer (Affective: A2):	1.0
Total:		10.0