# CSE 2105 – Data Structures

## 2022 – 2023 Fall Semester Project

**1.** Use B-Tree as a sorting machine. Write a java program that's passed an array of key values from main() to B-Tree and it writes them back to the array in sorted order. (20 pt.)

[5,6,4,8,10,22,35,46,15,52] → B-Tree → [4,5,6,8,10,15,22,35,46,52]

**2.** Create a dictionary of at least 30 words with Hash Table. Instead of using a linked list to resolve collisions, as in separate chaining, use a binary search tree. You'll create a hash table that is an array of trees. (You can use Binary Heap of course. It's up to you) (20 pt.)

Note: Your dictionary must have at least four words which starts with same letter. And Words and meanings should read file from "my_words.txt"

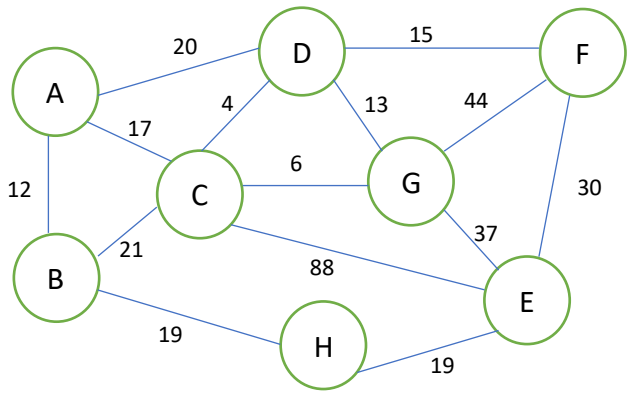
**Word:** computer / noun

**Meaning:** an electronic machine that can store and arrange large amounts of information

**3.** Write a Java Program implement M number stacks that should use only one array. The M number stacks must support these functions push and pop with stacks number. Ex: push('A',0) pushes 'A' letter to stack-0 and pop(3) takes element from stack-3. Consider the efficiency of your approach. (20 pt.)

myStackArray → [ stack0 | stack1 | stack2 | stack3| ……. | stack M-1 ]

**4.**




Write a Java program for given graph that finds path which connects all the vertices together, without any cycles and with the minimum possible total edge weight. (20 pt.)

Note: You must first create the data structure to represent the graph.

**!!!** Your implementations should be **efficient** as possible. Write your own algorithms! Write main codes to try your programs and show that they are working correctly.

**P.S.: -** You can prepare homework yourself (single person) or with one of your classmates.

- You have to submit a **report (very important!)**, and Java code (your classes) of your program. (You can use any IDE you want.). Explain your critical methods and classes. Discuss which data structures you used to overcome faced problems. Explain what advantages and disadvantages the data structure you use has. (20 pt.)

- Please upload your compressed(zip/rar) file(that includes your report and Java source code files ".java", not project files) to the **Microsoft Teams** page of the course to the appropriate area(projects that are sent via e-mail or other different ways of sending, will not be accepted !) before **25 December 2022, Sunday 23:59.**

- One of the group member's project upload is sufficient, but please write **your numbers** and **names** to your report and in Java source code files.

- A **face-to-face** interview will be held after the delivery of the project.