CSC 2720 Data Structures

Homework assignment 5

Instructions: Please complete the following questions on a separate sheet of paper. After you have finished, scan your work and upload it to **Homework Assignment 5** in our **Gradescope** for the **CSC 2720 DATA STRUCTURES XLS Group ACS11 Spring Semester 2025** course.

1. Inside the Castle of Asymptopia there is a maze, and along each corridor of the maze there is a bag of gold coins. The amount of gold in each bag varies. A noble knight, named Sir Paul, will be given the opportunity to walk through the maze, picking up bags of gold. He may enter the maze only through a door marked "ENTER" and exit through another door marked "EXIT." While in the maze he may not retrace his steps. Each corridor of the maze has an arrow painted on the wall. Sir Paul may only go down the corridor in the direction of the arrow. There is no way to traverse a "loop" in the maze. Given a map of the maze, including the amount of gold in each corridor, describe an algorithm to help Sir Paul pick up the most gold.
2. Dr. Amongus claims that the order in which a fixed set of entries is inserted into an AVL tree does not matter—the same AVL tree results every time. Give a small example that proves he is wrong.
3. Draw the 11-entry hash table that results from using the hash function, $h(i) = (3i+5) \bmod 11$, to hash the keys 12, 44, 13, 88, 23, 94, 11, 39, 20, 16, and 5, assuming collisions are handled by chaining.

Due Date: April 27, 2025