Assignment 5 (25 Marks)

Standard Deductions and Policies

SUBMISSION REQUIREMENTS: Submit a single zip file called **assignment5.zip**. It must contain all of your question code, sample data, and sample output. If you created your own test data, include this. If you did not, it is acceptable to include the provided sample data. Information regarding deductions for late submissions, invalid submissions, and grade disputes are available on the cuLearn assignment submission page.

LATE SUBMISSIONS: Submissions can be submitted up to 8 hours after the deadline. For each hour it is late, the assignment will receive a 2.5% penalty. No submissions will be accepted after this period for any reason. You are allowed as many resubmissions as you would like, but we can only see (and will only grade) the final submission. **If you submit early, and then resubmit late, you will receive the late penalty as we can not see previous submissions.**

INVALID SUBMISSIONS: Submissions with an incorrect name or that are not a ZIP will receive a **10% deduction**, with no exceptions. You are responsible for following the guidelines outlined in this assignment and in the course outline. Write clearly, use comments to explain strange behaviour.

GRADE DISPUTES: If you feel you were graded incorrectly, you have seven (7) days to contact the TA that graded your assignment to have it corrected. Their name and email should be in the feedback of your assignment when you receive your grades. After this, corrections will not be considered.

MARKING CHANGES: These marking notes are for reference only. Additional clarifications may take precedence if they are posted to cuLearn, weighting for questions is subject to change, part marks may be distributed or removed at TA and instructor discretion, and additional deductions may be made for not following instructions.

CONTACT & SUPPORT: Assignment clarifications are best made on cuLearn where everyone can see. Please use an informative title to make it easier to see if questions have been answered. Office hours are the best place to get one-on-one support with your assignment. Please come with planning work (pseudocode, flowcharts) prepared, and with questions ready.

Problem 1: Cached Fibonacci (8 marks)

- /1: Function accepts N and a cache dictionary
- /1: Main function prints result of a sufficiently large Fibonacci number for testing
- /2: Returns the correct Fibonacci number for a small value
  - 1 mark if printed instead of returning it, unless more than one value are printed
- /2: Uses recursion to calculate Fibonacci numbers
- /2: Uses recursion and a cache to calculate LARGE (>50) Fibonacci numbers

Problem 2: Cocktail Sort and Nearest Enemies (10 marks)

- /1: Function accepts a tuple for the hero and a list of tuples for enemies
- /1: Main function prints the result of one function call with at least three enemies
- /2: The function sorts **in-place** (it does not need to return anything, but it may)
- /4: Uses an algorithm similar enough to the cocktail-sort to sort elements
  - Bubbles up, bubbles down, small variations in implementation are fine
- /2: Correctly sorts by Euclidean distance and not the tuple value

Problem 3: Searching for an Exit (7 marks)

- /1: Function accepts a maze to search (start coord optional, explore cache can be default or passed)
- /4: Tested in main, demonstrating a single, valid path from beginning to end
  - 1 mark single valid, 2 drawn with path, 1 works for different tests
  - **Note**: Function need not actually return. Printing coords, printing the maze, anything with the path is valid - but 2 marks for drawing the maze out with the path in some way
- /2: Search function is based on recursive DFS (add to explored, search adjacent)

Recap

- Your cuLearn submission should be a single file, **assignment5.zip**
- Your zip file should contain **three files, question1.py, question2.py, question3.py**
  - If you require more files, if you did extras, this is acceptable
- **Each question should have a main function** which demonstrates the problem working correctly. It can be a simple print.
- Late submissions will receive a 2.5%/hour deduction up to an 8 hour cut-off period
- Invalid submissions (incorrect name, incorrect function names) will receive a 10% deduction immediately
- As usual, you are expected to submit periodically; as you complete questions, try to submit to cuLearn, just in case of data loss or last-minute submission problems.
- It is your responsibility to verify the submitted files work correctly - redownload and try them again