

CM1602 Data Structures and Algorithms for AI Coursework Specification (2020)	
Module Leader	Ragu Sivaraman
Unit (Group/Individual)	Individual
Weighing	40%
Qualifying Mark	30% (both parts)
Learning Outcomes Covered in this Assignment:	LO3: Apply appropriate data structures given a real-world problem to meet requirements of programming language APIs. LO4: Adapt and extend algorithms to real-world problems and address implementation requirements.
Handed Out Date	31 st May 2021
Due Date	26 th July 2021
Expected Deliverable	Source code and report
Method of Submission	Online
Method of Feedback and Due Date	Rubric Based Marking and feedback by 2 nd August 2021
BCS Criteria Met by this Assignment	

Assessment Regulations

Refer to the “How you are assessed section” in the Student Handbook for undergraduate students for a clarification of how you are assessed, penalties and late submissions, what constitutes plagiarism etc.

Penalty for Late Submission

Coursework received late without valid reason shall not be accepted and shall receive no grade, but shall count as one of the assessment opportunities prescribed in paragraph 9 of **RGU Academic Regulation A4 section 4.3**.

It is recognized that on occasion, illness, personal crisis or other valid circumstances can mean that you fail to submit and/or attend an assessment on time. In such cases you must inform the School of any extenuating circumstances through a **Coursework Extension Form** or a **Deferral Request Form**, with valid evidence for non-submission of an assessment up to a maximum of five working days after the assessment submission date. This information will be reported to the relevant Assessment Board that will decide whether a student should be allowed to reattempt without penalty (a deferral). For more detailed information regarding University Assessment Regulations and accessing forms, please refer to the following website: www.rgu.ac.uk/academicregulations

Grading

Marks will be awarded for the coursework based on the provided Grading Grid. These marks will be mapped onto a grade scale from A-F as determined by the individual module coordinator.

Coursework Specification

Task 1

A comic book convention or comic con is an event with a primary focus on comic books and comic book culture, in which comic book fans gather to meet creators, experts, and each other. Commonly, comic conventions are multi-day events hosted at convention centers, hotels, or college campuses. They feature a wide variety of activities and panels, with a larger number of attendees participating in cosplay than most other types of fan conventions. Comic book conventions are also used as a vehicle for industry, in which publishers, distributors, and retailers represent their comic-related releases. Comic book conventions may be considered derivatives of science-fiction conventions.

San Diego Comic-Con International is a nonprofit multigenre entertainment and comic book convention held annually in San Diego, California. It is a 5-day event. Tickets are sold online for this event. Normally before the start of ticket sales, the maximum number of tickets will be decided based on the capacity of the venue. This number is for a day. For example, if the maximum number is decided as 10000, 10000 tickets will be sold for each day, i.e. total of 50000 tickets.

The tickets will be sold to customers on a first-come-first-serve basis. The customers wait in a line to purchase the tickets. When the number of customers in the line reaches the maximum number of tickets available, the entry to the line will be prohibited. A customer can purchase ticket for one day or more than one day. A customer cannot purchase a ticket for another person and the tickets are non-transferable. Once all the tickets are sold, if there are any customers remaining in the line, they have to be informed.

- I. Select a Data Structure for this scenario. Justify your answer.
- II. Implement the Data Structure.
- III. Implement Ticketing System

Task 2

- a) Implement Linear Search and Binary Search Algorithms
- b) Compare the performance of the two algorithms you implemented in Task 2 Part a).
- c) Implement **two** sorting algorithms amongst Insertion Sort, Bubble Sort, Selection Sort, Merge Sort, and Quick Sort.
- d) Compare the performance of the two algorithms you implemented in Task 2 Part c).

Marking scheme

Criteria	Marks
Task 2	
<ul style="list-style-type: none">• Selection and Justification of the Data Structure	2
<ul style="list-style-type: none">• Implementation of the Data Structure	3
<ul style="list-style-type: none">• Tower of Hanoi implementation	15
<ul style="list-style-type: none">• Varying number of Disks	
Task 3	
<ul style="list-style-type: none">• Implementation of Searching Algorithms	5
<ul style="list-style-type: none">• Comparison of Searching Algorithms	5
<ul style="list-style-type: none">• Implementation of Sorting Algorithms	5
<ul style="list-style-type: none">• Comparison of Sorting Algorithms	5