Faculty of Engineering and Technology			
Ramaiah University of Applied Sciences			
Department	Computer Science and Engineering	Programme	B. Tech
Semester/Batch	03/2017		
Course Code	CSC202A	Course Title	Data structure and Algorithms
Course Leader	Vaishali R Kulkarni and Dr Pushphavathi T P		

Assignment - 02						
Register No			Name of Student			
Sections		Marking Scheme		**Marks**		
				Max Marks	First Examiner Marks	Moderator Marks
Part-A	A 1.1	Introduction to graph data structures		01		
	A 1.2	Graph theory ideas in transportation problem		02		
	A 1.3	Real life examples of graph for transportation		02		
		Part-A Max Marks		**05**		
Part B 1	B 1.1	Identify an application that requires sorting		02		
	B 1.2	Evaluate and choose the most appropriate one for your application		03		
	B 1.3	Implement a C program and test the same		05		
		Part-B 1 Max Marks		**10**		
Part B 2	B2.1	Introduction to BST		02		
	B2.2	Pseudocode/ Algorithm		03		
	B2.3	Implementation using C Program		03		
	B2.4	Computation of time and space complexity		02		
		Part-B 2 Max Marks		**10**		
		Total Assignment Marks		**25**		

Course Marks Tabulation				
Component- CET B Assignment	First Examiner	Remarks	Second Examiner	Remarks
A				
B.1				
B.2				
Marks (Max 25)				
Signature of First Examiner			Signature of Second Examiner	

Please note:

1. Documental evidence for all the components/parts of the assessment such as the reports, photographs, laboratory exam / tool tests are required to be attached to the assignment report in a proper order.
2. The First Examiner is required to mark the comments in RED ink and the Second Examiner's comments should be in GREEN ink.
3. The marks for all the questions of the assignment have to be written only in the **Component – CET B: Assignment** table.
4. If the variation between the marks awarded by the first examiner and the second examiner lies within +/- 3 marks, then the marks allotted by the first examiner is considered to be final. If the variation is more than +/- 3 marks then both the examiners should resolve the issue in consultation with the Chairman BoE.

Assignment 2

Term - 2

Instructions to students:

1. The assignment consists of **3** questions: Part A – **1** Question, Part B- **2** Questions.
2. Maximum marks is **25**.
3. The assignment has to be neatly word processed as per the prescribed format.
4. The maximum number of pages should be restricted to **10**.
5. Restrict your report for Part-A to 1 pages only.

6. Restrict your <u>report for Part-B to a maximum of 10 pages</u>.

7. The printed assignment must be submitted to the course leader.

8. **Submission Date:** 22/10 /2018

9. **Submission after the due date is not permitted.**

10. **IMPORTANT**: It is essential that all the sources used in preparation of the assignment must be suitably referenced in the text.

11. Marks will be awarded only to the sections and subsections clearly indicated as per the problem statement/exercise/question

Preamble:
This course is aimed at preparing the students to understand and apply the principles of data structures and algorithms, implement standard data structures and develop algorithms for efficient computer programs. A broad range of abstract data types as well as algorithms for data storage, access and manipulation used in program development are taught. Students are trained to develop applications using appropriate ADTs and algorithms, analyze them and generate an analytical report.

PART – A   **5 Marks**
Data structures are designed to organize and access data for efficient operations by algorithms**.** Graph data structure plays a key role in modeling data. In computer science, graphs are used to represent networks of communication, data organization, computational devices, the flow of computation, etc. Graphs are also used to model situation in which a commodity is transported from one location to another. Graphs offer a way of expressing relationships between pairs of items and model both real-life systems and abstract problems.

In this context write an essay on the topic: "**Application of graph data structures and algorithms for transportation networks"**

The essay should address the following:
A1.1 Introduction to data structures to represent graphs
A1.2 Importance and relevance of graph theoretical concepts and algorithms to the transportation problem
A1.3 Real life examples of transportation problem using a graph data structure

PART – B   **(20 Marks)**
B.1   **(10 Marks)**
Commercial computing, government organizations, financial institutions and commercial enterprises organize much of their information by sorting it. Some of the examples of sorting are: accounts to be sorted by name or number, transactions to be sorted by time or place, mail to be sorted by postal code or address and files to be sorted by name or date etc. In many applications, the data processing function requires an efficient sorting algorithm.

Design a generalized sorting technique for arranging the records in a database using a suitable sorting algorithm.
Your report should include:

B1.1 Identification of an application that requires sorting

B1.2 Evaluation of the available Sorting Algorithms and selection of the most appropriate one for your application

B1.3 Implementation of C program and testing of the same

B.2   **10 Marks**
Consider the design of a city database that stores the details of locations of a city. Each record contains the name of the city, addresses and the geographical coordinates. A city location map is to be designed that facilitates search by city name and it allows operations such as insert, delete, search etc.
Design a city location map using a suitable data structure and a search algorithm.
Your report should address the following:

B2.1 Introduction to search algorithms

B2.2 Design of an efficient data structure along with the corresponding algorithm

B2.3 A C program

B2.4 Computation of time and space complexity