RAMAIAH UNIVERSITY OF APPLIED SCIENCES

Faculty of Engineering and Technology			
Ramaiah University of Applied Sciences			
Department	Computer Science and Engineering	Programme	B. Tech. (CSE)
Semester/Batch	3rd/2017		
Course Code	CSC201A	Course Title	Discrete Mathematics-1
Course Leader(s)	Prof. N. D. Gangadhar		

Assignment – 01

Reg.No.		Name of Student	

Sections		Marking Scheme	Marks: Max Marks	First Examiner Marks	Moderator
Part A					
	A 1	Timed Logics and their CSE Applications	5		
		Part-A Max Marks	**5**		
Part B.1					
	B 1.1	Formal specifications of the given system	3		
	B 1.2	Verification of consistency of the specifications	5		
	B 1.3	Interpretation	2		
		B.1 Max Marks	**10**		
Part B.2					
	B 2.1	Generation of r-subsets	8		
	B 2.2	Time- and space-complexities	2		
		B.2 Max Marks	**10**		
		Total Assignment Marks	**25**		

Course Marks Tabulation

Component-1 (B) Assignment	First Examiner	Remarks	Moderator	Remarks
A				
B.1				
B.2				
Marks (Max 25)				

Signature of First Examiner **Signature of Moderator**

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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 - 01

Term - 1

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 2 pages only.
6. Restrict your report for Part-B to a maximum of 8 pages.
7. The printed assignment must be submitted to the course leader.
8. **Submission Date:** 24/09/2018
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

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Preamble

This subject is intended to teach the principles, concepts and applications of logic and discrete mathematical structures. Set theory, relations, functions, ordering, induction and modular integer arithmetic are covered. Theory and application of Propositional, Predicate and Hoare Logics for verification of computing systems are discussed. Abstract algebraic structures of Boolean algebras, lattices, groups, rings and fields are taught along with their computer science and engineering applications. Students are trained to solve and analyse logical and algebraic structures arising in computing contexts.

Part-A (05 Marks)

Propositional and Predicate Logics are the two fundamental and most applied logics. However, they do not explicitly employ the notion of time (dynamics) and hence are difficult to use in representing several computing system models such as flowcharts and sequence diagrams. Timed Logics, such as the Computational Tree Logic (CTL), are developed for this purpose.

In this context, the student is required to develop an essay on **"Timed Logics and their Computer Science and Engineering Applications"**.

Part B (20 Marks)

B.1 (10 Marks)

Verification of the consistency of system specifications is an important part of system development which is undertaken before the design. The student needs to perform the following for a given system:

- **B.1.1** Translate a set of at least five functional requirements into formal specifications using Propositional Logic.
- **B.1.2** Use Propositional Logic to verify the consistency of the identified specifications.
- **B.1.3** Interpret the result.

Note: Contact the Subject Leader for student specific data.

B.2 (10 Marks)

A genetic engineer is in need of a program to generate all the r-subsets of set of n given DNA strings. The student needs to perform the following:

- **B.2.1** Develop a program that takes the set of given DNA strings as input and generates a lexicographically ordered list of all the r-subsets.
- **B.2.2** Determine the time- and space-complexities of the program.

Note: Contact the Subject Leader for student specific data.