University of Moratuwa, Sri Lanka
Faculty of Engineering
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
B. Sc Engineering Honours Degree

CS3062 Theory of Computing (2 credits)
Semester 5, 14 Intake (Jan – May 2017)

Assignment 1 (Worth: 10%, Due: 15/03/2017 at 11:55PM)

All questions carry equal marks

1. Construct a DFA that accepts strings over the 4-symbol alphabet $\sum$={R, 0, 1, 2} and keeps a running count of the sum of the numerical input symbols it reads, modulo 3. When it receives the R symbol as input, it resets the count to 0. The DFA accepts if the sum is 0 modulo 3 (in other words, if the sum is a multiple of 3). Show the transition diagram of the DFA.

2. Let, the alphabet, $\sum$ be the 26 lower-case English letters. Let A, B be sets of strings defined over $\sum$ such that A={good, bad} and B={boy, girl}. Show the elements of the following 3 sets.
   (a). $A \cup B$
   (b). AB (concatenation of A and B)
   (c). A*   (Kleene Star of A)

3. Use the pumping lemma to prove that the language $L=\{ww \mid w \in \{0,1\}*\}$ is not regular.

4. Describe the language accepted by the following automaton.
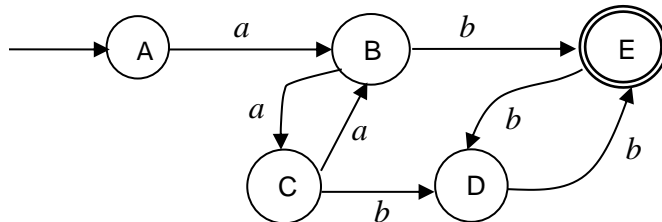
5. Suppose the NFA-Λ, $M_n = (\{S, A, B, F\}, \{0, 1\}, S, \{S, A, F\}, \delta)$ is given, where the transitions are specified as follows.

Current State	Next State(s)		
	Input 0	**Input 1**	**Input Λ**
S		S	A
A		B	F
B	A		
F		F	

Construct an equivalent DFA and show its transition diagram.

-------------------------------- End of Questions --------------------------------

How and What to Submit:
Create a PDF doc containing your answers. Name of the PDF file should contain your Registration Number (e.g., 143456Z) and zip the file before uploading to the Moodle LMS.