**TUTORIAL 4**

**FINITE AUTOMATA**

**DUE DATE: 19th DECEMBER 2019**

1. Construct a state transition diagram of a DFA that accepts all strings over {*a*, *b*, *c*} that begin with *a*, contain exactly two *b*'s, and end with *c*.
2. Construct a state transition diagram of a DFA that accepts the given set of strings over {0, 1}:

a) contain the substring 00 or 11.

b) begin AND end with 00.

c) begin OR end with 00*.*

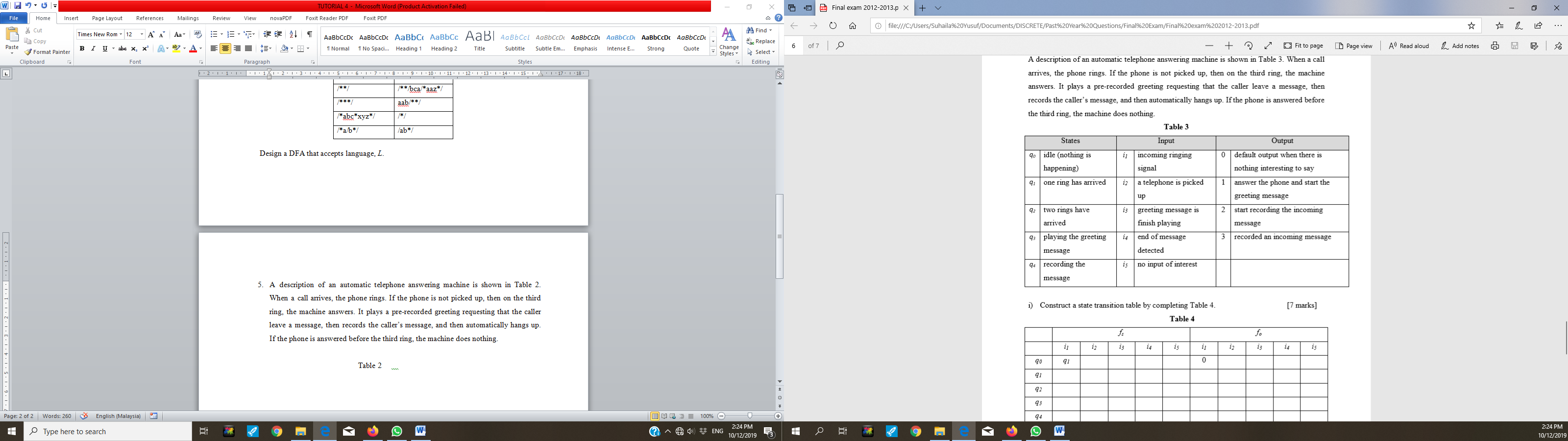
1. Construct a state transition diagram of a FSM that accepts the given set of strings over {*a*, *b*}:
2. contain exactly two *b*’s.
3. at least one b.
4. odd number of *a*’s
5. Suppose that a language, *L*, is a *C* programing language style comment such that *L* = { *w* | *w* is a C-style comment} with input alphabet, Σ={ a, b, c, …, z, \* , / }. Examples of accepted and rejected strings are shown in Table 1:

Table 1

|  |  |
| --- | --- |
| Accepted Strings | Rejected Strings |
| /\*abcz\*/ | /\*\* |
| /\*\*/ | /\*\*/bca/\*aaz\*/ |
| /\*\*\*/ | aab/\*\*/ |
| /\*abc\*xyz\*/ | /\*/ |
| /\*a/b\*/ | /ab\*/ |

Design a DFA that accepts language, *L*.

1. A description of an automatic telephone answering machine is shown in Table 2. When a call arrives, the phone rings. If the phone is not picked up, then on the third ring, the machine answers. It plays a pre-recorded greeting requesting that the caller leave a message, then records the caller’s message, and then automatically hangs up. If the phone is answered before the third ring, the machine does nothing. (

Table 2c)\*

1. Construct a state transition table by completing table below.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | *fs* | | | | | *fo* | | | | |
|  | *i1* | *i2* | *i3* | *i4* | *i5* | *i1* | *i2* | *i3* | *i4* | *i5* |
| *q0* |  |  |  |  |  |  |  |  |  |  |
| *q1* |  |  |  |  |  |  |  |  |  |  |
| *q2* |  |  |  |  |  |  |  |  |  |  |
| *q3* |  |  |  |  |  |  |  |  |  |  |
| *q4* |  |  |  |  |  |  |  |  |  |  |

1. Based on answer in (a), construct a state transition diagram for the telephone answering machine.