



المستوى: الثاني ساعات معتمدة
البرنامج: علوم الحاسب
المادة: نظرية الحاسبات
الكود: (202س)
التاريخ: 2023/ 12 / 31
الزمن: ساعتان
الدرجة الكلية: 70 درجة

نموذج امتحان نهائي الفصل الدراسي الاول
للعام الجامعي 2023/2022

جامعة دمياط
Damietta University
جامعة دمياط
كلية العلوم
قسم الرياضيات

Answer the following questions

Question 1:

(28 Marks)

A. Compare between Moore machine and Mealy machine.

(6 Marks)

B. Define the following:

(6 Marks)

Regular languages, DFA, Regular Expression.

C. State and prove the Arden's Theorem.

(6 Marks)

D. State true or false and correct the wrong statement

(10 Marks)

1. There are 6 tuples in DFA. (✓)
2. The transition function for NFA is $\delta: (\Sigma \cup \{\epsilon\}) \times Q \rightarrow Q$, where Q is a finite set of states and Σ is a set of alphabet. (✓)
3. Number of states require to accept string ends with 10, $\Sigma = \{0,1\}$ is 4 states. (✓)
4. If δ is transition function for DFA, then $\hat{\delta}(q, 10) = \delta(\hat{\delta}(q, 1), 0)$ where $\hat{\delta}$ is the extended transition function. (✓)
5. In Moore machine, output is produced over the change of states. (✓)
6. For a give Moore Machine, given input= "101010", thus the output would be of length 7. (✓)
7. Regular expression Φ^* is equivalent to Φ . (✓)
8. Regular expression for all strings starts with ab and ends with bba is $ab(a+b)^*bba$. (✓)
9. The two regular expressions $ab(c)$ and $ab(c)^*$ are equivalent. (✓)
10. If r is a regular expression, then $r^*.r^* = r^+$. (✓)

Question 2:

(42 Marks)

1. Design a Mealy machine which adds two binary integers x and y and give the Moore machine which is equivalent it.

(12 Marks)

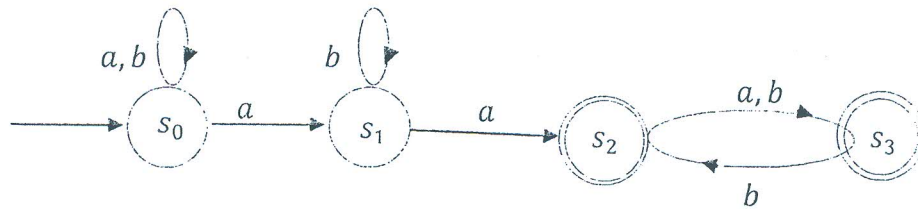
2. Assume an alphabet $\Sigma = \{0,1\}$.

(10 Marks)

- a. Design a DFA that describes the language of all strings that start with "01" or end with "01".
- b. Provide the regular expression that describes the language in part a.

3. Construct a DFA equivalent to given NFA.

(5 Marks)



4. Construct the NFA for the regular expression $(0+1)^*1(0+1)$.

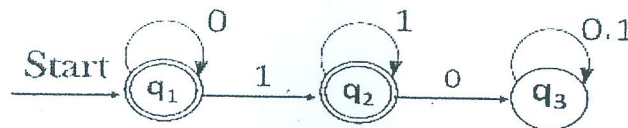
(5 Marks)

5. Prove that $(a+aa+\dots+a^n)(a+b)^* = a(a+b)^*$, $\forall n \geq 1$.

(5 Marks)

6. Construct the regular expression for the given DFA:

(5 Marks)



انتهت الاسئلة

مع أطيب التمنيات بالتوفيق

رئيس قسم الرياضيات: أ.د/ أحمد محمد كامل طرابيه

دكتور المادة: د / وفاء قوطه