

Stephen

Lucci

CSc 304 - Midterm Fall 2016

1. • Define

Unsolvable problem

Design problem

Due 24 hours

from receipt

(4 pts)

(2 pts)

2. • When is a problem intractable?

3. • What is a Turing Machine?

Why do we study this model of computation?

4. • Compare and contrast these models
of computation:

(5 pts)

finite state machine,
pushdown automaton.

5. • We are given two sets S_1 and S_2 .

To determine their cardinality, one
must count the number of elements in each.
(True or False). Explain!

6. • The set of natural numbers is a
finite set. True or False?

(3 pts)

7. Give an example of a set that is:

(3 pts)

- i. Countable finite

ii. Uncountably infinite.

iii. Accountably infinite

Explain your answers.

What is a Turing Machine ?
Why do we study this model of computation ?
Compare and contrast these models of computation :

finite state machine,
pushdown automaton.

are given two sets S_1 and S_2 . Determine their cardinality, one can count the number of elements (True or False). Explain !

Set of natural numbers is a finite set: True or False ?

True
Unsolvable problem
Design problem

(4 pts)

2. (2 pts) When is a problem

3. (4 pts) a. What is a Turing machine?

Midterm Fall 2010

Due 24 hours

from receipt

4. • Compare and contrast computation:

(5 pts)

intractable?

Machine?

this model of computation?

finite state machine
pushdown automaton

finite
autom.

5. • We are given two

(3 pts)

To determine their sets S_1 and S_2 .
cardinality, one must count the order of elements in each.
(True or False)

Explain

numbers is a
True or False?

6. The set of natural numbers

(3 pts)

finite set?

True

of a set that is;

i) countably infinite

ii) uncountably infinite

Explain your answer.

7.

Give an example

(3 pts)

i. Countable

ii. Uncountable

in-

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must count the number of elements in each.
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6. (3 pts) The set of natural numbers is a
finite set. True or False?
7. Give an example of a set that is:
 i: Countable ~~finite~~ iii) uncountably infinite
 ii) uncountably infinite. infinite
 Explain your answers.
- (3 pts)

2.

Deterministic Finite Automata

8. Design a $\{w \in \{a,b\}^*\}$ between
for:

(10 pts)

$L = \{ \text{of } a's \text{ there are } 3 \times i \text{ } b's$
each pair $\overbrace{\text{both}}^{i \geq 1}$ $\} \cup \{ \text{of } c's \text{ with } j \geq 2$

but not

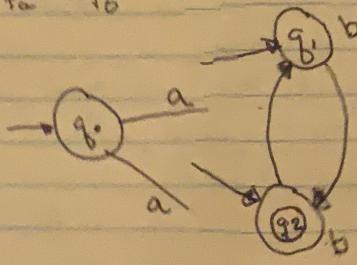
w strings that are
longer than 10

Provide two strings shorter than 12,
and three str-

be following

9. Convert the DFA
to

(6 pts)



10. Give a regular grammar for

(6 pts)

$$(x y x) (y \cdot x)^* x$$