V1

September 26, 2001

cs330 - Discrete Structures
Fall 2001

Midterm Exam
closed books, closed notes

Starts:**8:35 am** Ends**: 9:50 am**

Name:_____(please print)

ID: _____

Problem	Max points	Your mark	Comments
1	10		10*1
2	10		5+5
3	5		
4	10		4+3+3
5	5		
6	18		9*2
	58		

1. Let $A = \{\{a, b, ?\}\}$. Mark with true (T) or false (F) each of the following statements:

Statement	T/F
a ? A	
a ? A	
? ⁇ ⁇ A	
A⁇ ⁇	
{? } ? A	

Statement	T/F
{a} ? A	
{b} ? A	
?? ? ⁇ A	
? ? A	
{a, b} ? power(A)	

2. Let $A_i = \{1, 2, 3, ..., i\}$ for $i = 1, 2, 3, ...$ Find

a) $\bigcup_{i=1}^{n} Ai$

b) $\bigcap_{i=1}^{n} Ai$

3. Decide whether the relation represented by the following matrix: $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ is an equivalence relation. Explain.

4. This is the postfix (reverse Polish) notation for an algebraic expression:

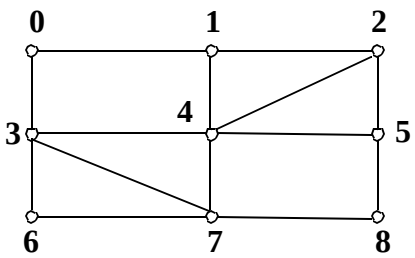
```
ab+cd*ef/--a*
```

a) Show the tree representation of this expression.

b) Show the corresponding algebraic expression

c) Show the prefix notation for the expression.

5. Let G be the graph below:



Do a graph traversal for this graph starting with the vertex given by the right-most digit of your Social Security Number (if that digit is 9, then the start vertex will be 0). Use a depth first algorithm.

6. Give a definition for:

a) relation on a set

b) partition of a set

c) Cartesian product

d) symmetric relation

e) union of sets

f) the power set of a set

g) Euler path in a connected graph

h) tree

i) spanning tree