UNIVERSITY OF IBADAN, DEPARTMENT OF COMPUTER SCIENCE
CSC 748 (Artificial Intelligence) C/A Test 2013/2014 session
Instructions: Attempt all questions in the spaces provided. Time allowed: 40 mins

NAME: _____ MAT No: _____

1) A network of roads connects n departments in University of Ibadan. You are required to find a path from a given start department to a given goal department along these roads.

(a) Which search algorithm can you possibly use for the problem above: ***breadth first***, ***depth limited*** or ***both***? _____

(b) What can you say about the completeness and optimality of breadth-first search on the above problem? _____

(c) What can you say about the completeness and optimality of depth-limited search on the above problem? _____

2) For each of the problem descriptions below, state which of the search algorithms that should be used and the one(s) that should be avoided : ***depth-first (DFS), breadth-first (BFS), depth-limited (DLS),*** and ***iterative deepening (IDS).***

Search problem	Search algorithms that can be used	Search algorithms that should be avoided
A search problem containing loops or cycles in the state-space description		
A search problem whose solution depth is not known		
Solving a search problem in which the available memory is very limited		

3) If A and B are two propositions, circle which of the following logical expressions that are equivalent?

(i) $X \vee \sim Y$ (ii) $\sim(\sim X \wedge Y)$ (iii) $(X \wedge Y) \vee (X \wedge \sim Y) \vee (\sim X \wedge \sim Y)$ (iv) $(X \wedge Y) \vee (X \wedge \sim Y) \vee (\sim X \wedge Y)$

4) By using a truth table or otherwise, state whether or not each of propositions P1 and P2 is tautology

P1 : $((A \wedge B) \rightarrow C)) \equiv ((A \rightarrow C) \wedge (B \rightarrow C))$

P2 : $((A \vee B) \rightarrow C)) \equiv ((A \rightarrow C) \vee (B \rightarrow C))$

5) Let A, B and C be three atomic prepositional assertions.
If D denote (A v B) → C and E denote (A → C) v (B → C).
Which one of the followings is/are tautology (Circle your choice(s)

D ↔ E D → E E → D ¬ D → E

6) Consider the following Prolog code:

```
ancestor(A,C) :- parent(A,C).
ancestor(A,C) :- parent(A,B), ancestor(B,C).
parent(alowonle, bamidele).
parent(bamidele, kolawole).
parent(kolawole, demilade).
parent(demilade, ewatomi).
```

What are all the possible solutions to the query:

```
?- ancestor(X, ewatomi)?
```

Your Solution here:

7) Answer **true (T)** or **false (F)** in the space provided

a) Uniform-cost search is a special case of Breadth-first search.	
b) Breadth-first search and uniform-cost search are special cases of best-first search.	
c) A* search is a special case of uniform-cost search with h(n) = 0.	
d) A successor function is a state that an agent is trying to reach	
e) The branching factor in a search tree refers to the number of actions available to the agent	
f) Alpha-beta pruning can alter the computed minimax value of the root of a game search tree.	
g) When doing alpha-beta pruning on a game tree which is traversed from left to right, the leftmost branch will never be pruned.	

8) Answer the following questions as related to an internet shopping agent

a) What are the percepts for this agent ? _____

_____

b) Characterize the operating environment in terms of:

(i) fully observable/**partially observable** _____

(ii) Episodic/**sequential** _____

(iii) discrete/continuous _____

c) What are the performance measures of this agent ?

d. What sort of agent architecture do you think is most suitable for this agent ?