

| | | |
|------------------------|---------------------------------|------------------------|
| Program: | Course: Artificial Intelligence | Course Code: CS460 |
| Level: 4 th | Lecturer: Dr. Ahmed Fouad Ali | Date: 5 /7 /2020 |
| Total pages: 6 | Total marks: 120 | Time allowed: 180 min. |

Answer the following questions:

Form 1

1- Determine the following statements are true or false (60 Marks).

- | | |
|---|-----|
| 1- Machines with minds is an example of acting rationally in AI. | (F) |
| 2- The study of the design of intelligent agents is an example of acting humanly in AI. | (F) |
| 3- The study of mental faculties through the use of computational models is an example of thinking rationally. | (T) |
| 4- The study of the computations that make it possible to perceive, reason, and act is an example of thinking humanly in AI. | (F) |
| 5- The art of creating machines that perform functions that require intelligence when performed by people is an example of acting rationally in AI. | (F) |
| 6- Turing test is an example of acting rationally in AI. | (F) |
| 7- In a Turing test, a computer passes the test if a human interrogator can tell the written responses come from a person or from a computer. | (F) |
| 8- The computer must have the natural language processing (NLP) capability to perceive objects. | (F) |
| 9- The computer must have knowledge representation capability to store what it knows or hears. | (T) |
| 10- The cognitive modeling approach is an example of thinking humanly in AI. | (F) |
| 11- The laws of thought approach is an example of thinking rationally in AI. | (T) |
| 12- The rational agent approach is an example of acting humanly in AI. | (F) |
| 13- The rational agent approach is more general than the laws of thought approach. | (T) |
| 14- An agent is anything that can be viewed as perceiving its environment through actuators and acting upon that environment through sensors. | (F) |
| 15- The agent function is a concrete implementation, running within some physical system. | (F) |
| 16- The agent program that maps any given percept sequence to an action. | (F) |
| 17- A rational agent is one that does the right thing. | (T) |
| 18- Roads and pedestrians are actuators in a taxi driver agent. | (F) |
| 19- Crossword puzzle is an example of a fully observable environment. | (F) |
| 20- Backgammon is an example of a deterministic environment. | (F) |
| 21- Taxi driving is an example of a partially observable environment. | (T) |
| 22- Part-picking robot is an example of a single agent environment. | (F) |
| 23- Taxi driving is an example of a deterministic environment. | (F) |
| 24- Part-picking robot is an example of an episodic environment. | (F) |

- 25- Simple reflex agents are agents which in addition to state information have a kind of goal information which describes desirable situations. (✓)
- 26- Utility-based agents base their decision on classic axiomatic utility-theory in order to act rationally. (✓)
- 27- Simple reflex agents have internal state which is used to keep track of past states of the world. (X)
- 28- Agents with goals take future events into consideration. (✓)
- 29- Simple reflex agents are example of rule-based systems. (✓)
- 30- Goal-based act by reasoning about which actions achieve the goal. (✓)
- 31- Utility-Based Agent is used for a measure of happiness. (✓)
- 32- In a learning agent, Critic provides feedback on the agent's performance based on a fixed performance standard. (✓)
- 33- In a learning agent, the performance element introduces improvements in performance element. (X)
- 34- In a learning agent, a problem generator suggests actions that will lead to new and informative experiences. (✓)
- 35- Problem formulation is the process of deciding what actions and states to consider, given a goal. (✓)
- 36- There are 6 components to formulate any problem. (X)
- 37- In a problem formulation, a description of what each action does is the goal test step. (X)
- 38- In the 8-puzzle problem, any state can be designated as the initial state. (✓)
- 39- In the 8-queens problem, any state can be designated as the initial state. (X)
- 40- The traveling salesperson problem (TSP) is an example of a toy problem in AI. (X)
- 41- In a tree search, successor nodes of a node mean its children. (✓)
- 42- In a tree search, predecessor node of a node means its parent. (X)
- 43- The distance from root to leaf in a tree search is called level. (✓)
- 44- The path in a tree search is a sequence of nodes along the edges of a tree. (X)
- 45- In the tree search algorithm, we use explored set to avoid cycle. (✓)
- 46- Explored set is used to remember every expanded node. (✓)
- 47- A graph can have loops and self-loops. (✓)
- 48- In the graph, there is no predefined number of edges, and it depends on the graph. (X)
- 49- Optimality means the algorithm guaranteed to find a solution when there is one. (X)
- 50- Space complexity means how long does it take to find a solution. (X)
- 51- The principal advantage of using a heuristic function is the reduction of the state space. (✓)
- 52- Best first search uses an evaluation function $f(n)$ and always chooses the next node to be that with the best score. (✓)
- 53- In greedy search, the idea is to expand the node with the best estimated cost to reach the goal. (✓)

- 54- The greedy best first search algorithm is a complete algorithm. ☒
- 55- Best First search is a special case of A* algorithm. ☒
- 56- Uniform Cost search is a special case of A* algorithm. ☒
- 57- A heuristic $h(n)$ is admissible if for every node n , $h(n) \leq h^*(n)$. ☒
- 58- A heuristic is consistent if $h(n) \leq c(n, a, n') + h(n')$. ☒
- 59- The time and space complexity of A* is bm . ☒
- 60- Recursive best-first search (RBFS) is an exponential-space algorithm. ☒

2- Choose the correct answer (60 Marks).

- 61- The exciting new effort to make computers think is called
(a) thinking humanly (b) acting humanly (c) thinking rationally (d) acting rationally
- 62- The study of mental faculties through the use of computational models is called
(a) thinking humanly (b) acting humanly (c) thinking rationally (d) acting rationally
- 63- The art of creating machines that perform functions that require intelligence when performed by people is called.....
(a) thinking humanly (b) acting humanly (c) thinking rationally (d) acting rationally
- 64- The study of how to make computers do things at which, at the moment, people are better is called
(a) thinking humanly (b) acting humanly (c) thinking rationally (d) acting rationally
- 65- The Turing test approach is an example of
(a) thinking humanly (b) acting humanly (c) thinking rationally (d) acting rationally
- 66- The is used to enable it to communicate successfully in English.
(a) natural language processing (NLP) (b) robotics (c) machine learning (d) computer vision
- 67- The capability is used in computer to perceive objects.
(a) natural language processing (NLP) (b) robotics (c) machine learning (d) computer vision
- 68- The cognitive modeling approach is an example of
(a) thinking humanly (b) acting humanly (c) thinking rationally (d) acting rationally
- 69- The "laws of thought" approach is an example of
(a) thinking humanly (b) acting humanly (c) thinking rationally (d) acting rationally
- 70- The agent can perceive its environment through
(a) actuators (b) sensors (c) actions (d) receivers
- 71- The sensors detect all aspects that are relevant to the choice of action in environment.
(a) partially observable (b) semi observable (c) fully observable (d) non observable
- 72- A vacuum agent with only a local dirt sensor is an example of environment.
(a) partially observable (b) semi observable (c) fully observable (d) non observable
- 73- A crossword puzzle is an example of a agent.
(a) semi (b) multi (c) double (d) single



- 74- Taxi driving is an example of a environment.
(a) partially observable (b) semi observable (c) fully observable (d) non observable
- 75- Part-picking robot is an example of environment.
(a) partially observable (b) semi observable (c) fully observable (d) non observable
- 76- The maps from percept histories to actions.
(a) agent program (b) agent (c) agent function (d) rational agent
- 77- The runs on the physical architecture to produce the function.
(a) agent program (b) agent (c) agent function (d) rational agent
- 78- The agents are based on condition-action rules.
(a) simple reflex (b) goal based (c) model based (d) utility based
- 79- The agents are stateless devices which do not have memory of past world states.
(a) simple reflex (b) goal based (c) model based (d) utility based
- 80- The agents take future events into consideration.
(a) simple reflex (b) goal based (c) model based (d) utility based
- 81- The agents are called rule-based systems.
(a) simple reflex (b) goal based (c) model based (d) utility based
- 82- The agents have a function to measure of happiness.
(a) simple reflex (b) goal based (c) model based (d) utility based
- 83- The provides feedback on agent's performance based on fixed performance standard in learning agent approach.
(a) learning element (b) performance element (c) problem generator (d) critic
- 84- The selecting actions based on percepts in learning agent approach.
(a) learning element (b) performance element (c) problem generator (d) critic
- 85- The suggests actions that will lead to new and informative experiences in learning agent approach.
(a) learning element (b) performance element (c) problem generator (d) critic
- 86- The process of looking for a sequence of actions that reaches the goal is called.....
(a) perceiving (b) searching (c) acting (d) sequencing
- 87- A description of what each action does in the problem formulation is called.....
(a) initial state (b) actions (c) transition model (d) goal test
- 88- The determines whether a given state is a goal state in the problem formulation.
(a) initial state (b) actions (c) transition model (d) goal test
- 89- The initial state in 8-queens problem is.....queens on the board.
(a) all (b) four (c) one (d) no
- 90- The goal test in 8-queens problem is.....queens on the board without any attack.
(a) all (b) four (c) one (d) no



Form 1

- 91- The node has no parent in the tree search.
(a) successor (b) leaf (c) ☒ root (d) predecessor
- 92- The distance from root to leaf in the trees search is called
(a) branch (b) ☒ height (c) level (d) path
- 93- The Sequence of nodes along the edges of a tree is called
(a) ☒ branch (b) height (c) level (d) path
- 94- A tree has edges.
(a) n (b) $n + 1$ (c) ☒ $n - 1$ (d) zero
- 95- The explored set is used in a search.
(a) tree (b) ☒ graph (c) exploration (d) exploitation
- 96- A can have loops and self-loops.
(a) tree (b) queue (c) linked list (d) ☒ graph
- 97- The in algorithm means the algorithm guaranteed to find a solution when there is one.
(a) optimality (b) ☒ completeness (c) validation (d) verification
- 98- Breadth first search (BFS) is an example of a (an) search.
(a) guided (b) informed (c) ☒ blind (d) goal based
- 99- The frontier in breadth first search uses a
(a) ☒ queue (b) stack (c) linked list (d) priority queue
- 100- Breadth first search (BFS) is called path first.
(a) longest (b) cheapest (c) deepest (d) ☒ shortest
- 101- Depth first search (DFS) is an example of a (an) search.
(a) guided (b) informed (c) ☒ blind (d) goal based
- 102- The frontier in the depth first search uses a
(a) queue (b) ☒ stack (c) linked list (d) priority queue
- 103- Depth first search (DFS) is called path first.
(a) ☒ longest (b) cheapest (c) shallowest (d) shortest
- 104- Uniform cost search (UCS) is an example of a (an) search.
(a) guided (b) informed (c) ☒ blind (d) goal based
- 105- The frontier in the uniform cost search uses a
(a) queue (b) stack (c) linked list (d) ☒ priority queue
- 106- Uniform cost search (UCS) is called path first.
(a) longest (b) ☒ cheapest (c) shallowest (d) shortest
- 107- The time complexity in the breadth first search is
(a) linear (b) quadratic (c) ☒ exponential (d) logarithmic
- 108- The space complexity in the breadth first search is
(a) linear (b) quadratic (c) ☒ exponential (d) logarithmic
- 109- The time complexity in the depth first search is
(a) linear (b) quadratic (c) ☒ exponential (d) logarithmic
- 110- The space complexity in the depth first search is
(a) ☒ linear (b) quadratic (c) ☒ exponential (d) logarithmic



Suez Canal University
Faculty of Computers and Informatics
Department of Computer Science



Form 1

| | | | |
|--|---|---|------------------------|
| 111- The search can be viewed as a special case of depth-limited search with ($l = \infty$). | | | |
| (a) breadth first | (b) <input checked="" type="checkbox"/> depth-first | (c) uniform cost | (d) A * |
| 112- The space complexity in the depth-limited search is | | | |
| (a) linear | (b) quadratic | (c) <input checked="" type="checkbox"/> exponential | (d) logarithmic |
| 113- The search combines the benefits of depth-first and breadth-first search. | | | |
| (a) <input checked="" type="checkbox"/> Iterative deepening | (b) bi-directional | (c) greedy best first | (d) A * |
| 114 - A* search is an example of a (an) search. | | | |
| (a) unguided | (b) <input checked="" type="checkbox"/> informed | (c) blind | (d) goal based |
| 115- Greedy best first is an example of a (an) search. | | | |
| (a) unguided | (b) <input checked="" type="checkbox"/> informed | (c) blind | (d) goal based |
| 116- Uniform cost search is a special case of A* search if | | | |
| (a) $g(n)=0$ | (b) $f(n)=0$ | (c) <input checked="" type="checkbox"/> $h(n)=0$ | (d) $f(n)=h(n)$ |
| 117- Best first search is a special case of A* search if | | | |
| (a) <input checked="" type="checkbox"/> $g(n)=0$ | (b) $f(n)=0$ | (c) $h(n)=0$ | (d) $f(n)=g(n)$ |
| 118- A heuristic $h(n)$ is admissible if for | | | |
| (a) <input checked="" type="checkbox"/> $h(n) \leq h^*(n)$ | (b) $h(n) = h^*(n)$ | (c) $h(n) > h^*(n)$ | (d) $h(n) \geq h^*(n)$ |
| 119- A heuristic is consistent if $h(n) \leq c(n, a, n') + h(n')$ | | | |
| (a) $>$ | (b) <input checked="" type="checkbox"/> \leq | (c) $=$ | (d) \geq |
| 120- Recursive best-first search (RBFS) is a space algorithm. | | | |
| (a) exponential | (b) quadratic | (c) <input checked="" type="checkbox"/> linear | (d) logarithmic |

The end of the exam

Dr. Ahmed Fouad Ali

dept 1

$$f(n) = g(n) + h(n)$$

DLS

A* L