

TIME:1 Hour

TOTAL MARKS: 20

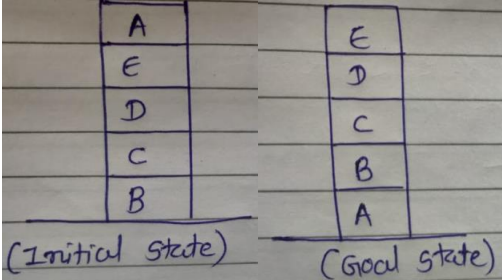
Instructions:

1. Figures to the right indicate full marks.
2. Be precise and to the point in your answer.

Q.1

Discuss the disadvantages of hill climbing for the given block world problem. Also explain the solution to recover those problems.

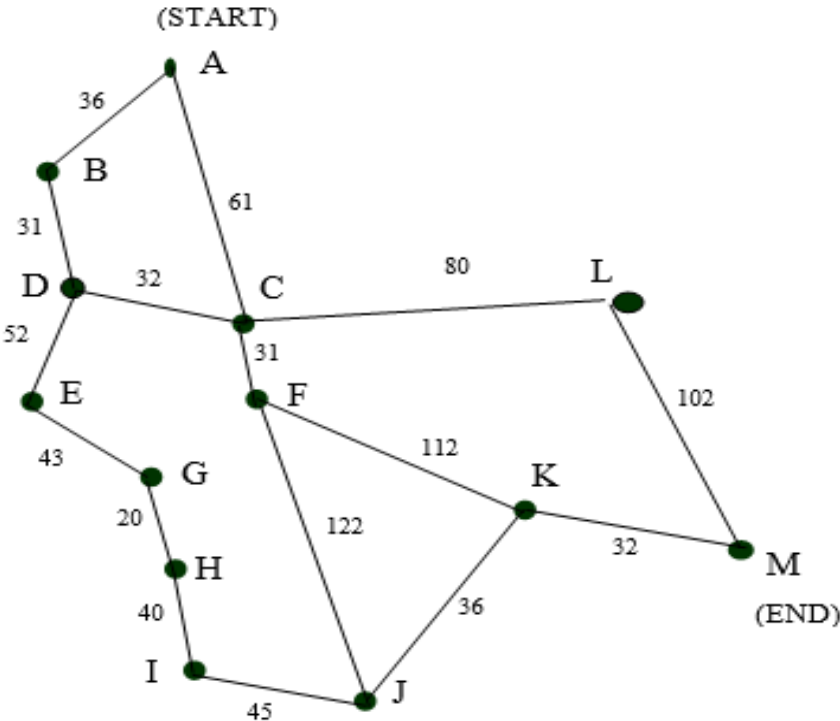
[5]



Q.2

Consider the following image.

[6]



Apply A* algorithm on a given graph to work out on a route from node A to node M. Use the following cost function.
g(n) = The cost of each move as the distance between each town (shown on map).
h(n) = The Straight Line Distance between any town and town M. These distances are given in the table below.

A	223	E	165	I	100	M	0
B	222	F	136	J	60		
C	166	G	122	K	32		
D	192	H	111	L	102		

Answer the following questions:

- i) The search tree that is produced, showing the cost function at each node.
- ii) State the order in which the nodes were expanded
- iii) State the route that is taken, and give the total cost

Q.3

What do you mean by problem reduction method? Explain it by matrix multiplication example having three matrices with its dimension as A1 [4*1], A2 [1*6], A3 [6*8].

[4]

Q.4

Assume that a genetic algorithm uses chromosomes of the form $x = abcdefgh$ with a fixed length of eight genes. Each gene can be any digit between 0 and 9. Let the fitness of individual x be calculated as:

[2]

$f(x) = (a + b) - (c + d) + (e + f) - (g + h)$,
and let the initial population consist of four individuals with the following chromosomes:
 $x1 = 6\ 5\ 4\ 1\ 3\ 5\ 3\ 2$
 $x2 = 8\ 7\ 1\ 2\ 6\ 6\ 0\ 1$
 $x3 = 2\ 3\ 9\ 2\ 1\ 2\ 8\ 5$
 $x4 = 4\ 1\ 8\ 5\ 2\ 0\ 9\ 4$

Evaluate the fitness of each individual, showing all your workings, and arrange them in order with the fittest first and the least fit last.

Q.5

Assume following facts which is used in Expert System:

[3]

- Meera only likes easy courses.
- Science courses are hard.
- All the courses on the basketweaving department are easy.
- AB123 is a basketweaving course.

Use resolution tree to answer the question: “What course would Meera like?”