1st Practical Evaluation

Two beings, a human (H), and a octopus (O) arrives to a world with a specific missions, their initial point is indicated in the map. They already get a complete world map, besides everybody speak a common language and are able to communicate between them. In order to open the portal (P) to return, is necessary to make the following (order doesn’t matter).

1. Get the portal key (K)
2. Destroy the dark temple (D)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | A | B | C | D | E | F | G | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 |
| 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |  |  | D |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  | H |  |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 9 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 10 |  |  |  |  |  |  |  |  |  |  | **P** |  |  |  |  |
| 11 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 12 |  |  |  |  |  |  |  |  |  |  |  |  |  | O |  |
| 13 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 14 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 15 |  |  |  |  |  |  |  |  |  |  |  |  |  | K |  |

Consider that every one of the members have advantage over certain terrain and disadvantage in others, as is showed next

|  |  |  |  |
| --- | --- | --- | --- |
| Color | Means | Cost movement | |
| Human | Octopus |
|  | Mountain | N/A | N/A |
|  | Earth | 1 | 4 |
|  | Water | 2 | 1 |
|  | Sand | 3 | N/A |
|  | Forest | 4 | 3 |

Also consider:

1. The simple fact of arriving the cell with an objective means accomplish it, except for the portal that have special specifications listed below.
2. To activate the portal all the objectives have to be accomplished and all the team members have to be in the cell portal.
3. Two or more individual could be in the same cell at the same time without problem.

The purpose is to accomplish the missions with the minimum global cost possible. So we want to distribute the mission between the team members in accordance with their abilities and possibilities, thus is if the assignment of the two missions to only one individual reduces the global cost, then that is the solution, but the other member still have to arrive to the portal and this cost have to be considered.

1. Found the cost of every possible route segments using A\*and fill the table, considering:

I🡪 Start point of the individual

D🡪 Dark Temple

K🡪Key

P🡪Portal

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | I-P | I-K | I-D | K-D | D-K | K-P | D-P |
| Human |  |  |  |  |  |  |  |
| Octopus |  |  |  |  |  |  |  |

2. Calculate the total cost of each individual for every possible route. Filling the following table:

|  |  |  |
| --- | --- | --- |
| Individual | Route | Total cost |
| Human | I-P |  |
| I-K-P |  |
| I-D-P |  |
| I-K-D-P |  |
| I-D-K-P |  |
| Octopus | I-P |  |
| I-K-P |  |
| I-D-P |  |
| I-K-D-P |  |
| I-D-K-P |  |

For example, for the human and I-k-p write the total cost of the best path for the individual from the start point to the key and from there to the portal

1. Assign every individual to the best-suited mission, fill the following table and show the path followed for everyone in the map.

|  |  |  |
| --- | --- | --- |
| Individual | Route assigned | Cost |
| Human |  |  |
| Octopus |  |  |
| Total (Global) | ----------- |  |

System requirements:

1. The map can be loadable from a text file
2. The position of the dark temple and the key can be changed
3. The initial point of any agent can change
4. The terrain costs for an agent can change
5. A method for automatic route assignment for every individual must be defined and have to try (although not ever do it) to find the minimum global cost.
6. An animation of the route followed for each can be showed