Assignment 3

Part 1 a)

A, F, K, B, C, H, G, L, M, R, W, X, Y

Part 2

a/

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| A | -- | 3 | -- | B | -- | 5 | -- | C | -- | 4 | -- | D | -- | 7 | -- | E |
| | |  |  |  | | |  |  |  | | |  |  |  | | |  |  |  | | |
| 5 |  |  |  | 9 |  |  |  | 2 |  |  |  | 11 |  |  |  | 8 |
| | |  |  |  | | |  |  |  | | |  |  |  | | |  |  |  | | |
| F | -- | 10 | -- | G | -- | 4 | -- | H | -- | 8 | -- | I | -- | 6 | -- | J |
| | |  |  |  | | |  |  |  | | |  |  |  | | |  |  |  | | |
| 4 |  |  |  | 2 |  |  |  | 6 |  |  |  | 3 |  |  |  | 9 |
| | |  |  |  | | |  |  |  | | |  |  |  | | |  |  |  | | |
| K | -- | 8 | -- | L | -- | 3 | -- | M | -- | 5 | -- | N | -- | 4 | -- | O |
| | |  |  |  | | |  |  |  | | |  |  |  | | |  |  |  | | |
| 7 |  |  |  | 10 |  |  |  | 5 |  |  |  | 8 |  |  |  | 4 |
| | |  |  |  | | |  |  |  | | |  |  |  | | |  |  |  | | |
| P | -- | 5 | -- | Q | -- | 4 | -- | R | -- | 7 | -- | S | -- | 9 | -- | T |
| | |  |  |  | | |  |  |  | | |  |  |  | | |  |  |  | | |
| 6 |  |  |  | 8 |  |  |  | 2 |  |  |  | 3 |  |  |  | 7 |
| | |  |  |  | | |  |  |  | | |  |  |  | | |  |  |  | | |
| U | -- | 1 | -- | V | -- | 7 | -- | W | -- | 6 | -- | X | -- | 2 | -- | Y |

b/

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| A |  | B |  | C |  | D |  | E |  |
|  |  |  |  |  |  |  |  |  |  |
| F |  | G |  | H |  | I |  | J |  |
|  |  |  |  |  |  |  |  |  |  |
| K |  | L |  | M |  | N |  | O |  |
|  |  |  |  |  |  |  |  |  |  |
| P |  | Q |  | R |  | S |  | T |  |
|  |  |  |  |  |  |  |  |  |  |
| U |  | V |  | W |  | X |  | Y |  |

Part 3

a/ the spanning tree in part 2 inside layout show how exactly the nodes is connected to each other

just like how the maze in part 1 inside is connected to each other the part 2 is exactly the maze but without the borders/wall

b/ an algorithm based on this assignment can be created through these step

Step 1/ Create any kind of square grid with any size. We say the part that is surrounded by borders is a node

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Step 2/ Choose any random node at anywhere from the gird mark it and add it to the maze

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Step 3/ Mark the adjacent nodes around the maze. Specifically, the right, up, left, down nodes. Leave out the diagonal nodes. If the node is already a part of the maze then it will not be chosen.

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Step 4/ Choose one of any node at random mark it. Remove the wall between the node and the maze

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Step 5/ rinse and repeat until every node is part of the maze

Step 6/ chose any 2 wall/edge from the outmost border (the border that cover the whole maze) and remove it to create the entrance and the exit of the maze. Choose any to be either the entrance or the exit

Continue of the example 9 nodes later

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Continue of maze 14 nodes later

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maze 11 nodes later

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Remove the 2 edge to make entrance and exit

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