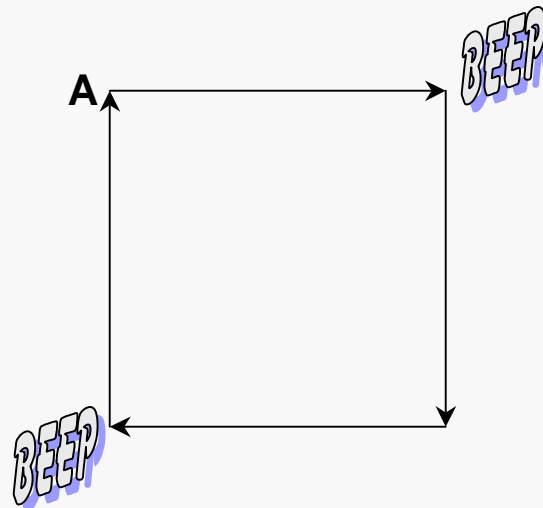


Consider a simple robot that can move forward, turn at any specified angle, and beep.

We want to design an algorithm to solve the problem:

Make the robot walk in a square one meter on a side, and beep when it reaches the second and fourth corners of the square. The robot should do this ten times.

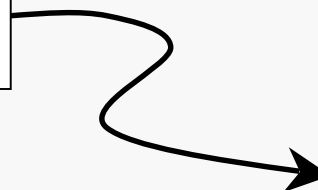
Assume initially the robot is at point A (diagram) and facing east (right):



Assume we have a list of golf scores, as shown below, and our problem is to determine:

- which player achieved the best score
- what the best score was
- how many players competed
- what the average score was

Player	Score
Miller	70
Kite	72
Watson	68
Trevino	67
Niklaus	68



Winner:	Trevino
Winning score:	67
Number of players:	5
Average score:	69.0

We may make the following assumptions:

- Each line of our data file (except the first) will have a player's name and then that player's score.
- Each score will be a positive integer.
- There will be a finite number (possibly zero) of players.

What must we do?

1. Read the name and score for each player.
2. Remember the lowest* score we've seen so far and who got it.
3. If the current player has a lower score, remember that player as the best so far.
4. Count how many players we've seen.
5. Calculate the average score.
6. Report our findings.

Player	Score
Miller	70
Kite	72
Watson	68
Trevino	67
Niklaus	68

* Example of problem domain knowledge.

Refining the design:

```
Set PlayerCount to 0.  
Set WinnerName to be empty.  
Set WinnerScore to be huge.  
Read: Name and Score for the first player.  
While the read operation found data:  
    Add 1 to PlayerCount.  
    If Score is less than WinnerScore then  
        Set WinnerName to Name.  
        Set WinnerScore to Score.  
    EndIf  
    Read: Name and Score for next player.  
EndWhile  
.  
.  
.
```

Player	Score
Miller	70
Kite	72
Watson	68
Trevino	67
Niklaus	68

Test the design: this is sometimes called a "walkthrough" or a "desk check". We don't have a program yet, just a design, so we check by carrying out the specified operations by hand on a representative set of input data...

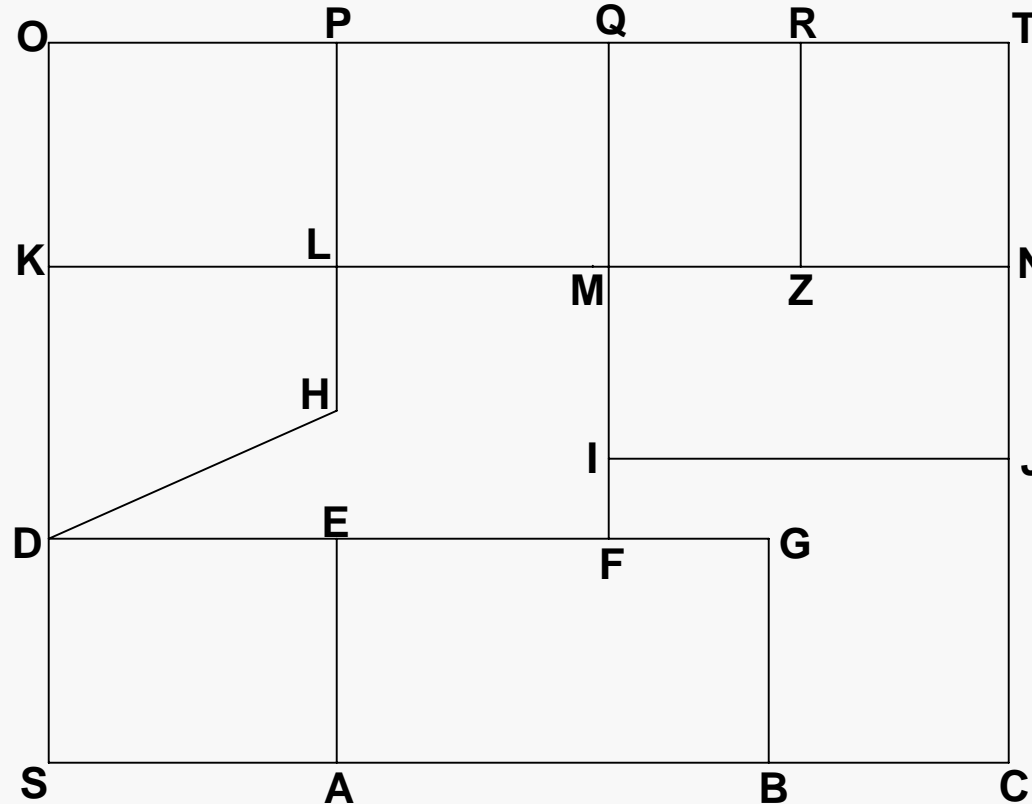
Player	Score
Miller	70
Kite	72
Watson	68
Trevino	67
Niklaus	68

PlayerCount	WinnerName	WinnerScore
0	(none)	(huge)
1	Miller	70
2	Miller	70
3	Watson	68
4	Trevino	67
5	Trevino	67

Are the results correct? What have we missed?

You've moved to a new town and you live at S (map below). Your favorite restaurant is at Z. You use the local bus service to travel, and there is a separate fare to go from each corner to the next.

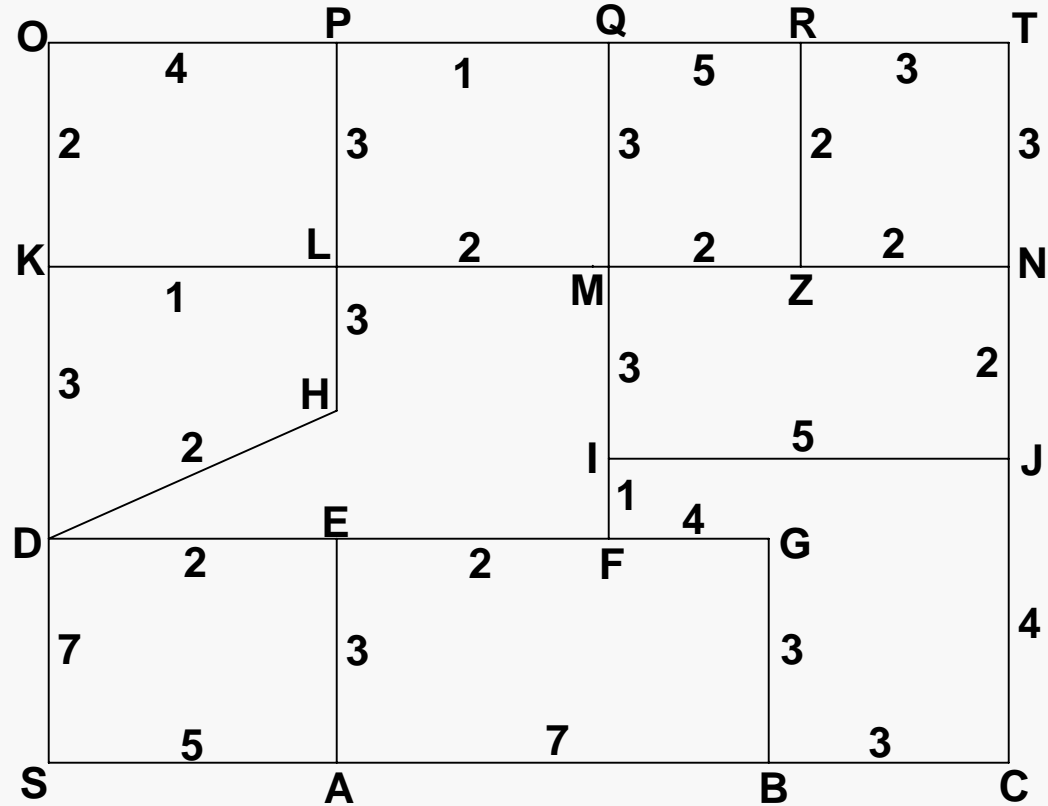
Problem: how can you determine the cheapest path from S to Z?



Shortest Path Continued

Problem: how can you determine the cheapest path from S to Z?

Here are the fares:



Shortest Path Found

Here's the cheapest path:

