

Introduction to Computing: Tutorial 2

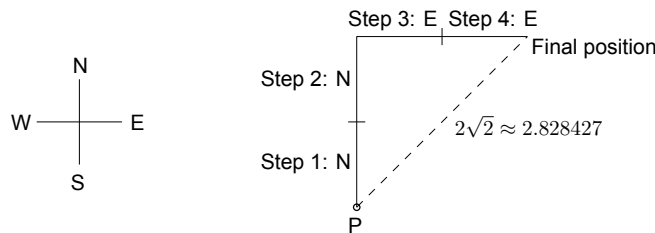
BSDS I Year, 2026–2027

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1. Consider a particle that is initially at a point P . The particle starts moving, and moves for n steps. At each step, it moves unit distance in either the North or South or East or West direction. Write a program to find the distance of the final position of the particle from its starting position P .

Input: The sequence of steps moved by the particle in the form of a string made up of the letters N, S, E and W, representing the direction in which the particle moves at each step.

Example: Suppose the input string is "NNEE". This means that the particle moves 4 steps in all, first 2 steps North, and then 2 steps East, as shown in the figure below.



Your program should print a value close to 2.828427.

4. Consider a snail at the foot of a pole that is h metres high. The snail starts climbing up the pole at an initial speed of c metres / hour. After every d hours of climbing, the snail takes a nap for z hours. While it is asleep, it slips down the pole at s metres / hour. After waking up from the nap, it continues climbing, but its speed reduces by $p\%$ of the speed that it had just before it took this nap.

- (a) In your answer booklet, write the expressions / conditions corresponding to the blanks in the pseudo-code below, so that the code determines the total number of hours it takes the snail to reach the top of the pole. If the snail can never reach the top of the pole, the code should print an appropriate message.

Step 1. Set `remainingHeight` to h , `speed` to c , and `numHours` to 0.

Step 2. If _____, print message:
 "Snail reaches the top in _____ hours"
 and STOP.

Step 3. Otherwise, increment `numHours` by _____;
 decrement `remainingHeight` by _____.

Step 4. If _____, print message:
 "Snail will never be able to reach the top"
 and STOP.

Step 5. Otherwise, set `speed` to _____,
 and repeat from Step 2.

- (b) Implement the pseudocode in Python (or in R or C for partial credit).