

DATE: ___/___/___

Name:

Danijal Saeed

Sap id:

53937

Section:

BS Data Science

Course:

Analysis of Algorithm

Assignment 1

Question 1:

Algorithm Drive - School To Home ()

Input start (RIU 1-14/3)

destination = "Gisja Road"

Step 1

move forward (650m)

current location \leftarrow "Sector 1-14/3"

Step 2

move forward (800m) via Road B

current location \leftarrow "Bata Chok"

Step 3

Move forward (8-1 km) via

main Gisja Road

current location \leftarrow "Gisja Road"

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Step 4

current location \leftarrow destination

Output

("Arrived at Home")

Stop
End Algorithm

Facts of Algorithm

Variable:

Start: initial location (RIU)

Destination: final location
(Home)

Current location: keeps track of progress

Distance: values like 650m, 800m, 8.1km

Input Statement

Read (Start, destination)

Calculations

Total distance = 650m + 800m + 8.1km
= 9.55km

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Assignments:

current location \leftarrow : start

current location \leftarrow sector 1-14/3

current location \leftarrow "Road Bita chuk"

current location \leftarrow "Girja Road my Home"

current location \leftarrow "destination"

Question 2

Algorithm Square Root - linear search (n)

Input n (positive Integer)

output: Integer part of \sqrt{n}

Step 1 // initialization

$i \leftarrow 1$

Step 2 // loop until square exceeds n

while $(i*i) \leq n$ do

$i \leftarrow i+1$

End while

Step 3 // correct overshoot

$i \leftarrow i-1$

Step 4 // output Result

output ("Square root of", n "=" i)

end algorithm

Facts of Algorithm

Variables:

$n \rightarrow$ input number

$i \rightarrow$ counter variable

Input statement:

Read (n)

Calculation:

Repeatedly check $(i+i) \leq n$

Stop when $(i+i) > n$

answer = $i-1$

Output statement:

"Square Root of n is i "

Assignment:

$i \leftarrow 1$

$i \leftarrow i + 1$

$i \leftarrow i - 1$

(inside loop)

(final correction)

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Assignment 1

Question 3

Algorithm find common elements
(A, B, m, n)

$i \leftarrow 0$, $j \leftarrow 0$

while $i < m$ and $j < n$

if $A[i] = B[j]$ Then

output $A[i]$

$i \leftarrow i + 1$

$j \leftarrow j + 1$

Else if $A[i] < B[j]$ then

$i \leftarrow i + 1$

else

End while

End algorithm

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Facts of Algorithm

Variable :

A, B, i, j, m, n

Input statements

Read (A, B, m, n)

Calculation :

Compare element and move P.

Output statement:

Print common elements

Assignment:

$i \leftarrow i + 1$

$j \leftarrow j + 1$

Maximum Comparison:

At most $m+n-1$ comparison in worst case.

GitHub Link