Algorithms : Lab 6

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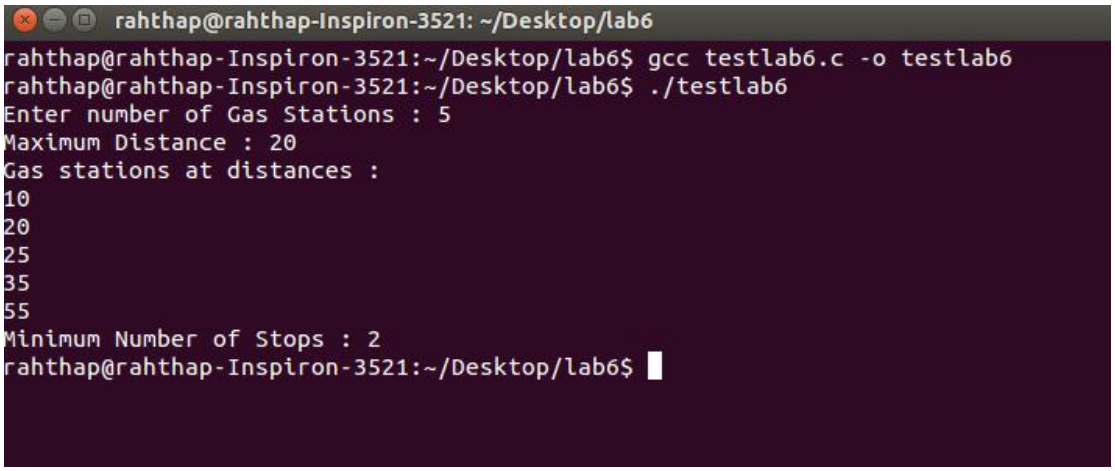
Problem Statement :

Suppose you were to drive from point A to point B. Your gas tank with a capacity C, when full, holds enough gas to travel m miles. You have a precise map that gives distances between gas stations along the route. Let d1 < d2 < …. < dn be the locations of all the gas stations along the route where di is the distance from point A to the gas station. You can assume that the distance between neighboring gas stations is at most m miles.

In the case that the rate at which you can fill your tank at a gas station is r (in liters/minute), so if you stop to fill your tank from 2 liters to 8 liters, you would have to stop for 6/r minutes. Give the most efficient greedy solution, where you need to minimize the total time you stop for gas filling?

Screenshot :



Algorithm :

1. Distance is calculated between the consecutive gas stations.

2. If this distance >= m (max distance), then refill the tank and count (stop) +=1
3. If the distance < m, then array is traversed and count remains same.
4. CODE given below:

INPUTS :
N = number of gas stations
M = Max distance
D = Distance of gas stations from starting point A.

OUTPUT:
Minimum number of stops in order to reach from point A to point B.

CODE:

```
/*
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*/
#include<stdio.h>
#include<stdlib.h>
#define MAX 100

int arr[MAX];
int temp1[MAX];
int temp2[MAX];
int main(){

  int m,n,i,j,k;
  int count=0;

  printf("Enter number of Gas Stations : ");
  scanf("%d",&n);
  printf("Maximum Distance : ");
  scanf("%d",&m);
  printf("Gas stations at distances : \n");

  for(i=0;i<n;i++){
    scanf("%d",arr+i);
  }

  temp2[0]=1;
  j=k=count=0;
  for(i=1;i<n;i++)
    {
      while(arr[i]-arr[j] > m)
    count-=temp2[j++];
      temp1[i]=temp1[j]+1;
      while(temp1[k]==temp1[j])
    count+=temp2[k++];
      temp2[i]=count;
    }
  printf("Minimum Number of Stops : %d\n",temp1[n-1]-1);
  return 0;
}
```