

## Design and Analysis of Algorithm Lab5

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### Car fueling sub problem:

#### Code:

```
import java.util.Scanner;

public class cars2 {

    static int cars(int distance,int tank,int stops[],int n) {

        int currentrefills=0;

        int numrefills=0;

        int lastrefills=0;

        while(currentrefills<=n-1) {

            lastrefills=currentrefills;

            while((currentrefills<=n-1) && stops[currentrefills+1]-stops[lastrefills]<=tank) {

                currentrefills=currentrefills+1;

            }

            if(currentrefills==lastrefills)

                return -1;

            if(currentrefills<=n)

                numrefills=numrefills+1;

        }

        System.out.println("Possible");

        return numrefills;

    }

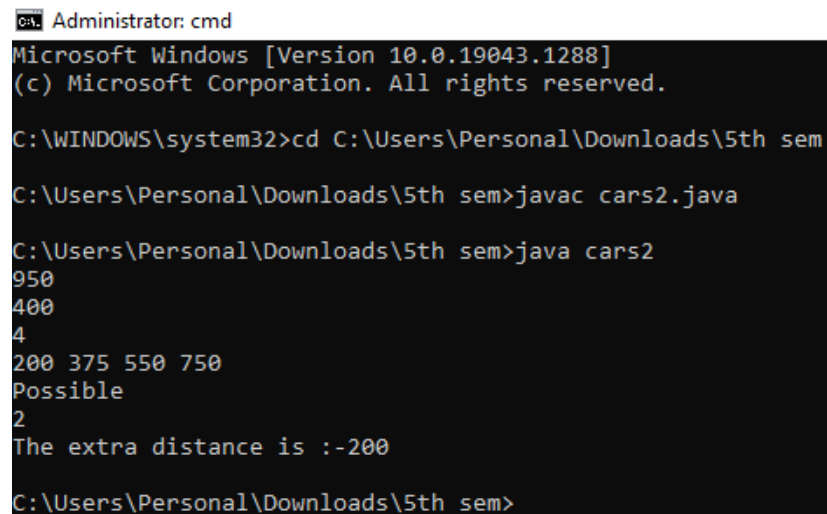
}
```

```

public static void main(String[] args) {
Scanner sc=new Scanner(System.in);
int distance=sc.nextInt();
int tank=sc.nextInt();
int n=sc.nextInt();
int stops[]=new int[n*n*n];
for(int i=0;i<n;i++) {
stops[i]=sc.nextInt();
}
System.out.println(cars(distance,tank,stops,n));
tank=distance-stops[3];
System.out.println("The extra distance is :-"+tank);
}
}

```

## Output:



```

Administrator: cmd
Microsoft Windows [Version 10.0.19043.1288]
(c) Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>cd C:\Users\Personal\Downloads\5th sem

C:\Users\Personal\Downloads\5th sem>javac cars2.java

C:\Users\Personal\Downloads\5th sem>java cars2
950
400
4
200 375 550 750
Possible
2
The extra distance is :-200

C:\Users\Personal\Downloads\5th sem>

```

## **Asymptotic Analysis:**

```

MinRefills(x, n, L)
numRefills ← 0, currentRefill ← 0
while currentRefill < n:
    lastRefill ← currentRefill
    while (currentRefill ≤ n and x[currentRefill + 1] -
           x[lastRefill] ≤ L):
        currentRefill ← currentRefill + 1
    if currentRefill == lastRefill:
        return -1
    if currentRefill ≤ n:
        numRefills ← numRefills + 1
return numRefills

```

$$T(n) = O(n)$$

Input: 950  
400  
4  
200 375 550 750

output: 2

200      375      550      750      950

we should fill at 375 because  
we can max go till 400

200      375      550      750      950

1st fill      2nd fill

Min fills = 2

To go back to 750 you need to travel  
200km we can ~~trick~~ travel upto  
400km we already completed 200km  
by going to 950 from 750 remaining  
200 is enuff to go back to 750