

פתרון 23411 מבוא למדעי מחשב מ' / ח' ( 4 / 23411/ 7 ) סמסטר חורף תשע"ה

שאלה 1

(1)

סיבוכיות זמן:  $n^2$

סיבוכיות מקום:  $\log(n)$

(2)

סיבוכיות זמן:  $n^2 \log(n)$

סיבוכיות מקום: 1

(3)

סיבוכיות זמן:  $n^{1.5}$

סיבוכיות מקום: 1

שאלה 2

א.

```
#define LETTERS 'z'-'a'+1
```

```
Bool elf_language(char* word){
```

```
    Int letters[LETTERS]={0};
```

```
    Return elf_language_aux(word,letters);
```

```
}
```

```
Bool elf_language_aux(char* word,int letters[]) {
```

```
    If(!*word)
```

```
        Return letters['e'-'a'] && letters['i'-'a'] && letters['r'-'a'];
```

```
    Letters[*word-'a']=1;
```

```
    Return elf_language_aux(word+1,letters);
```

```
}
```

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```
Else{
    Low--;
    If(low>=0)
        Sum+=a[low];
    }
}

Return false;
}

Int closest(int a[], int n, double x){
    Int low=0, high =n-1;
    While(low<=high){
        Int mid = (low+high/2);
        If(a[mid]>x)
            High=mid-1;
        Else If (a[mid]<x)
            High=mid+1;
        Else
            Return mid;
    }
    Return abs(x-a[low]) < abs(x-a[high]) ? low : high;
}

Int abs(int x){
    Return x>0 ? x :-x;
}
```

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```
#define LETTERS 'z'-'a'+1

Bool middle_earth_langue(char* nation, char* word){
    Int letters[LETTERS]={0};
    For(int i=0; nation[i];i++)
        Letters[word[i]-'a']=0;
    For(int i=0; i<LETTERS;i++)
        If(Letters[i]>0)
            Return false;

    Return true;
}
```

שאלה 3

```
Bool find_average(int a[], int n, double x){
    Int low, high, sum;
    Low=high=closest(a,n,x);
    Sum=a[low];
    While (low>=0 && high<n){
        Double avg = (double) sum/(high-low+1);
        If(avg == x)
            Return true;
        Else if (avg < x){
            High++;
            If(high<n)
                Sum+=a[high];
        }
    }
```

```
Int sameAvgGroups(int a[], int n, int res[]){
```

```
    Return sameAvgGroupsAux(a,n,res,0,0,0,0);
```

```
}
```

```
Int sameAvgGroupsAux(int a[],int n, int res[], int asum, int alen,int rsum, int rlen){
```

```
    If(!n)
```

```
        Return average(asum,alen) == average (rsum,rlen) ? rlen : 0;
```

```
    Int without = sameAvgGroupsAux(a+1,n-1,res, asum+a[0],alen+1,rsum, rlen);
```

```
    If(without)
```

```
        Return without;
```

```
    Res[rlen++]=a[0];
```

```
    Return sameAvgGroupsAux(a+1,n-1,res,asum,alen, rsum+a[0],rlen);
```

```
}
```

```
Double average(int sum,int len){
```

```
    Return len > 0 ? (double) sum/len : 0;
```

```
}
```