2022NOC初中组C++选拔赛

一、单项选择题

1 B 2 D 3 B 4 A 5 A 6 B 7 B 8 C 9 A 10 D 11 C

12 D 13 B 14 A 15 C

二、程序设计题

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密码翻译

```cpp
#include <iostream>
#include <string>
using namespace std;

int main()
{
    int k;
    cin >> k;
    string s;
    cin >> s;
    for (int i = 0; i < s.size(); i++)
    {
        if (s[i] >= 'A' && s[i] <= 'Z')
        {
            s[i] = ((s[i] - 'A' - k) % 26 + 26) % 26 + 'A';
        }
        if (s[i] >= 'a' && s[i] <= 'z')
        {
            s[i] = ((s[i] - 'a' - k) % 26 + 26) % 26 + 'a';
        }
    }
    cout << s << endl;
    return 0;
}
```

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体操训练

```cpp
#include <cstdio>
#include <cmath>
#include <algorithm>
#include <iostream>
#include <cstring>
#include <string>
using namespace std;
```

```cpp
int a[1005][1005];
int pos[1005][1005];
int k, n;

bool chk(int x, int y)
{
    for (int i = 1; i <= k; i++)
    {
        if (pos[i][x] > pos[i][y])
        {
            return false;
        }
    }
    return true;
}

int main()
{
    cin >> k >> n;
    for (int i = 1; i <= k; i++)
    {
        for (int j = 1; j <= n; j++)
        {
            cin >> a[i][j];
            pos[i][a[i][j]] = j;
        }
    }
    int cnt = 0;
    for (int i = 1; i <= n; i++)
    {
        for (int j = 1; j <= n; j++)
        {
            if (i == j) continue;
            if (chk(i, j))
            {
                cnt++;
            }
```

```
        }
    }
    cout << cnt << endl;
    return 0;
}
```

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飞越摩天楼

```
#include <cstdio>
#include <iostream>
#include <algorithm>
using namespace std;

const int N = 1e5 + 5;
int n, a[N];

int main()
{
    scanf("%d", &n);
    for (int i = 1; i < n; i++)
        scanf("%d", &a[i]);
    sort(a + 1, a + n);
    // 把两个气球安排在最大的距离中间
    int x = (a[n - 1] + 2) / 3;
    x = max(x, a[n - 2]);
    // 把两个气球分别安排最大和次大的距离中间
    int y = (a[n - 1] + 1) / 2;
    y = max(y, a[n - 3]);
    printf("%d\n", min(x, y));
    return 0;
}
```

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比K大的数

```
#include<iostream>
#include<cstdio>
#include<cstring>
#include<cmath>
#include<string>
#include<algorithm>
using namespace std;

const int MR = 1e6 + 10;
int n, k[MR], a[MR], b[10], c[10];
int dp[MR];
char s[MR];

int main()
{
    scanf("%d%s", &n, s);
    for (int i = 1; i <= 9; i++) scanf("%d", c + i);
    int m = strlen(s);
    if (m > n)
    {
        printf("-1\n");
        return 0;
    }
    if (m < n)
    {
        for (int i = 1; i <= 9; i++)
        {
            for (int j = 1; j <= c[i]; j++)
            {
                printf("%d", i);
            }
        }
        printf("\n");
        return 0;
    }
    for (int i = 1; i <= n; i++) k[i] = s[i - 1] - '0';
    for (int i = 1; i <= 9; i++) b[i] = 0;
    //dp[i]表示前i-1位和k一样，第i位比k[i]大的情况下
    //第i位可以取的最小值
    //b数组记录每个数到目前用了几次
    for (int i = 1; i <= n; i++)
    {
        for (int j = k[i] + 1; j <= 9; j++)
        {
            if (b[j] < c[j])
```

```
            {
                dp[i] = j;
                break;
            }
        }
        if (b[k[i]] < c[k[i]])
        {
            b[k[i]]++;
        }
        else break;
    }
    //for(int i=1;i<=n;i++) printf("%d",v[i]);printf("\n");
    //找最靠后的非0的v值
    int cur = -1;
    for (int i = n; i >= 1; i--)
    {
        if (dp[i])
        {
            cur = i;
            break;
        }
    }
    //如果没找到，输出-1
    if (cur == -1)
    {
        printf("-1\n");
        return 0;
    }
    //找到了，输出前半段（与k相同的部分）和后边段（从小到大排列）
    for (int i = 1; i < cur; i++)
    {
        a[i] = k[i];
        c[k[i]]--;
    }
    a[cur] = dp[cur];
    c[a[cur]]--;
    for (int i = 1; i <= 9; i++)
    {
        for (int j = 1; j <= c[i]; j++)
        {
            cur++;
            a[cur] = i;
        }
    }
    for (int i = 1; i <= n; i++) printf("%d", a[i]); printf("\n");
    return 0;
}
```