Week 5 Reference Solutions

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1. Given n numbers, list them in reverse order.

   - Idea: Just output the array from the last element to the first element.
   - Sample Input:

```
5
10 20 30 40 50
```

   - Sample Output:

```
50 40 30 20 10
```

   - Solution:

```cpp
#include<bits/stdc++.h>
using namespace std;

int main(){
    int arr[10005], n;
    cin >>n;
    for(int i=0;i<n;++i){
        cin >>arr[i];
    }
    for(int i=n-1;i>=0;--i){
        cout<<arr[i]<<' ';
    }
}
```

2. Given n numbers, list the frequency of each number.

   - Idea: Use an array to count the frequency of each number.
   - Sample Input:

```
7
1 1 2 2 3 3 3
```

   - Sample Output:

```
1:2
2:2
3:3
```

- Solution:

```cpp
#include<bits/stdc++.h>
using namespace std;

int main(){
    int arr[105]={0}, n, mx=-1;
    cin >>n;
    for(int i=0;i<n;++i){
        int tmp;
        cin >>tmp;
        mx=max(mx, tmp);
        ++arr[tmp];
    }
    for(int i=0;i<=mx;++i){
        if(arr[i])cout<<i<<":"<<arr[i]<<'\n';
    }
}
```

3. The formula of standard deviation is:$SD = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(x_i - \mu)^2}$, where μ is the mean of the n numbers. Given n numbers, calculate the standard deviation.

   - Idea: First calculate the mean, then calculate the standard deviation using the formula.
   - Sample Input:

```
5
1 2 3 4 5
```

   - Sample Output:

```
1.41421
```

   - Solution:

```cpp
#include<bits/stdc++.h>
using namespace std;

int main(){
    int arr[10005], mean=0, n;

    cin >>n;
    for(int i=0;i<n;++i){
        cin >>arr[i];
        mean+=arr[i];
    }
    mean/=n;

```

```
14      double sd=0;
15      for(int i=0;i<n;++i){
16          sd+=(arr[i]-mean)*(arr[i]-mean);
17      }
18      sd=sqrt(sd/n);
19
20      cout<<sd;
21  }
```

4. Given n numbers, find the length of the longest continuous increasing subsequence.

    - Idea: Enumerate the strat of the subsequence, and extend it as long as possible.