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Programming-1 CS112 **Practice problems (Arrays)** Dr. Amin Allam

⇒ Problem 1

Write a program that takes an input integer n (assume $1 \leq n \leq 20$), then takes an input array of n integer values: $a[0], a[1], \ldots, a[n-1]$, then takes an input value b. The program should output the number of occurrences of b in the array a. For example, if the user inputs 3 5 2 5 5 which means that $n = 3, a = \{5, 2, 5\}, b = 5$, the program should output 2 which is the number of occurrences of 5 in the array a (because $a[0] = 5$ and $a[2] = 5$). If a does not contain the value b print "None". If the user inputs $n \leq 0$ or $n \geq 21$ print "Error".

Input: 3 5 2 5 5 Output: 2	Input: 7 4 6 7 7 6 6 8 6 Output: 3	Input: 4 9 8 8 9 8 Output: 2	Input: 2 3 4 7 Output: None	Input: -3 Output: Error	Input: 25 Output: Error

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

int main()
{
   int i, n;
   int a[20];
   cin>>n;
   if(n<=0 || n>=21) {cout<<"Error"<<endl; return 0;}
   for(i=0; i<n; i++) cin>>a[i];

   int cnt=0;
   for(i=0; i<n; i++)
   {
      if(a[i]==b) cnt++;
   }
   if(cnt==0) cout<<"None"<<endl;

   return 0;
}
```

⇒ Problem 2

Write a program that takes an input integer n (assume $1 \leq n \leq 20$), then takes an input array of n integer values: $a[0], a[1], \ldots, a[n-1]$, then takes an input value b. The program should output all the indexes of occurrences of b in the array a. For example, if the user inputs 3 5 2 5 5 which means that $n = 3, a = \{5, 2, 5\}, b = 5$, the program should output 0 2 which are the indexes of a containing the value 5 (because $a[0] = 5$ and $a[2] = 5$). If a does not contain the value b print "None". If the user inputs $n \leq 0$ or $n \geq 21$ print "Error".

Input: 3 5 2 5 5 Output: 0 2	Input: 7 4 6 7 7 6 6 8 6 Output: 1 4 5	Input: 4 9 8 8 9 8 Output: 1 2	Input: 2 3 4 7 Output: None	Input: -3 Output: Error	Input: 25 Output: Error

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

int main()
{
   int i, n;
   int a[20];
   cin>>n;
   if(n<=0 || n>=21) {cout<<"Error"<<endl; return 0;}
   for(i=0; i<n; i++) cin>>a[i];

   bool found=false;
   for(i=0; i<n; i++)
   {
      if(a[i]==b)
      {
         cout<<i<<" ";
         found=true;
      }
   }
   if(!found) cout<<"None"<<endl;

   return 0;
}
```

⇒ Problem 3

Write a program that takes an input integer n (assume $1 \leq n \leq 20$), then takes an input array of n integer values: $a[0], a[1], \ldots, a[n-1]$, then takes an input value b. The program should output the number of integers of a which do not equal b. For example, if the user inputs 3 5 4 5 4 which means that $n = 3, a = \{5, 4, 5\}, b = 4$, the program should output 2 which is the number of integers of a which do not equal to 4 (because $a[0] = 5$ and $a[2] = 5$). If a does not contain any value other than b print "None". If the user inputs $n \leq 0$ or $n \geq 21$ print "Error".

Input: 3 5 4 5 4 Output: 2	Input: 7 4 6 7 7 6 6 8 6 Output: 4	Input: 4 9 8 8 9 8 Output: 2	Input: 2 7 7 7 Output: None	Input: -3 Output: Error	Input: 25 Output: Error

```
1  #include <iostream>
2  using namespace std;
3
4  int main()
5  {
6     int i, n;
7     int a[20];
8     cin>>n;
9     if(n<=0 || n>=21) {cout<<"Error"<<endl; return 0;}
10    for(i=0; i<n; i++) cin>>a[i];
11
12    int cnt=0;
13    for(i=0; i<n; i++)
14    {
15       if(a[i]!=b) cnt++;
16    }
17    if(cnt==0) cout<<"None"<<endl;
18
19    return 0;
20 }
```

⇒ Problem 4

Write a program that takes an input integer n (assume $1 \leq n \leq 20$), then takes an input array of n integer values: $a[0], a[1], \ldots, a[n-1]$, then takes an input value b. The program should output all values of a which do not equal to b. For example, if the user inputs 3 5 2 4 2 which means that $n = 3, a = \{5, 2, 4\}, b = 2$, the program should output 5 4 which are the values of a not equal to 2 (because $a[0] = 5$ and $a[2] = 4$). If a does not contain any value other than b print "None". If the user inputs $n \leq 0$ or $n \geq 21$ print "Error".

Input: 3 5 2 4 2 Output: 5 4	Input: 7 4 6 7 7 6 6 8 6 Output: 4 7 7 8	Input: 4 9 8 8 9 8 Output: 9 9	Input: 2 7 7 7 Output: None	Input: -3 Output: Error	Input: 25 Output: Error

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

int main()
{
   int i, n;
   int a[20];
   cin>>n;
   if(n<=0 || n>=21) {cout<<"Error"<<endl; return 0;}
   for(i=0; i<n; i++) cin>>a[i];

   bool found=false;
   for(i=0; i<n; i++)
   {
      if(a[i]!=b)
      {
         cout<<a[i]<<" ";
         found=true;
      }
   }
   if(!found) cout<<"None"<<endl;

   return 0;
}
```

⇒ Problem 5

Write a program that takes an input integer n (assume $1 \leq n \leq 20$), then takes an input array of n integer values: $a[0], a[1], \ldots, a[n-1]$, then takes an input value b. The program should output all values of a which are less than b. For example, if the user inputs $4\ 4\ 5\ 2\ 4\ 5$ which means that $n = 4, a = \{4, 5, 2, 4\}, b = 5$, the program should output $4\ 2\ 4$ which are the values of a less than 5 (because $a[0] = 4$, $a[2] = 2$, and $a[3] = 4$). If a does not contain any value less than b print "None". If the user inputs $n \leq 0$ or $n \geq 21$ print "Error".

Input: 4 4 5 2 4 5 Output: 4 2 4	Input: 7 4 6 7 7 6 6 8 7 Output: 4 6 6 6	Input: 4 9 8 8 9 9 Output: 8 8	Input: 2 3 4 3 Output: None	Input: -3 Output: Error	Input: 25 Output: Error

```
1  #include <iostream>
2  using namespace std;
3
4  int main()
5  {
6     int i, n;
7     int a[20];
8     cin>>n;
9     if(n<=0 || n>=21) {cout<<"Error"<<endl; return 0;}
10    for(i=0; i<n; i++) cin>>a[i];
11
12    bool found=false;
13    for(i=0; i<n; i++)
14    {
15       if(a[i]<b)
16       {
17          cout<<a[i]<<" ";
18          found=true;
19       }
20    }
21    if(!found) cout<<"None"<<endl;
22
23    return 0;
24 }
```

⇒ Problem 6

Write a program that takes an input integer n (assume $1 \leq n \leq 20$), then takes an input array of n integer values: $a[0], a[1], \ldots, a[n-1]$, then takes an input value b. The program should output all values of a which are greater than b. For example, if the user inputs 4 4 5 2 4 2 which means that $n = 4, a = \{4, 5, 2, 4\}, b = 2$, the program should output 4 5 4 which are the values of a greater than 2 (because $a[0] = 4$, $a[1] = 5$, and $a[3] = 4$). If a does not contain any value greater than b print "None". If the user inputs $n \leq 0$ or $n \geq 21$ print "Error".

Input: 4 4 5 2 4 2 Output: 4 5 4	Input: 7 4 6 7 7 6 6 8 6 Output: 7 7 8	Input: 4 9 8 8 9 8 Output: 9 9	Input: 2 3 4 5 Output: None	Input: -3 Output: Error	Input: 25 Output: Error

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

int main()
{
   int i, n;
   int a[20];
   cin>>n;
   if(n<=0 || n>=21) {cout<<"Error"<<endl; return 0;}
   for(i=0; i<n; i++) cin>>a[i];

   bool found=false;
   for(i=0; i<n; i++)
   {
      if(a[i]>b)
      {
         cout<<a[i]<<" ";
         found=true;
      }
   }
   if(!found) cout<<"None"<<endl;

   return 0;
}
```

⇒ Problem 7

Write a program that takes an input integer n (assume $1 \leq n \leq 20$), then takes an input array of n integer values: $a[0], a[1], \ldots, a[n-1]$. The program should output all unique (not repeated) values of a. For example, if the user inputs 7 4 8 2 4 2 5 2 which means that $n = 7, a = \{4, 8, 2, 4, 2, 5, 2\}$, the program should output 8 5 which are the unique (not repeated) values of a. If a does not contain any unique value print "None". If the user inputs $n \leq 0$ or $n \geq 21$ print "Error".

Input: 7 4 8 2 4 2 5 2 Output: 8 5	Input: 5 4 6 6 7 6 Output: 4 7	Input: 6 9 8 2 8 9 9 Output: 2	Input: 4 3 6 6 3 Output: None	Input: -3 Output: Error	Input: 25 Output: Error

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

int main()
{
   int i, j, n;
   int a[20];
   cin>>n;
   if(n<=0 || n>=21) {cout<<"Error"<<endl; return 0;}
   for(i=0; i<n; i++) cin>>a[i];

   bool found=false;
   for(i=0; i<n; i++)
   {
      bool unique=true;
      for(j=0; j<n; j++)
      {
         if(i!=j && a[i]==a[j]) unique=false;
      }
      if(unique)
      {
         cout<<a[i]<<" ";
         found=true;
      }
   }
   if(!found) cout<<"None"<<endl;

   return 0;
}
```

⇒ Problem 8

Write a C++ program that takes two input integers n and m (assume $1 \leq n \leq 20$ and $1 \leq m \leq 20$), then takes an input array a of n integer values: $a[0], a[1], \ldots, a[n-1]$, then takes another input array b of m integer values: $b[0], b[1], \ldots, b[m-1]$. The program should output all values which exist in both arrays a and b. For example, if the user inputs 3 4 5 2 6 6 4 3 2 which means that $n = 3$, $m = 4$, $a = \{5, 2, 6\}$, $b = \{6, 4, 3, 2\}$, the program should output 2 6 which are the values which exist in both arrays a and b. If no value exists in both arrays a and b print "None". If the user inputs $n \leq 0$ or $n \geq 21$ print "Error". If the user inputs $m \leq 0$ or $m \geq 21$ print "Error".

Input: 3 4 5 2 6 6 4 3 2 Output: 2 6	Input: 4 3 6 4 3 2 5 2 6 Output: 6 2	Input: 4 5 1 2 3 4 2 4 6 8 10 Output: 2 4	Input: 5 2 8 6 7 2 1 3 6 Output: 6	Input: 5 4 1 2 3 4 5 6 7 8 9 Output: None	Input: 3 -4 Output: Error	Input: 25 5 Output: Error

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

int main()
{
   int i, j, n, m;
   int a[20], b[20];
   cin>>n>>m;
   if(n<=0 || n>=21) {cout<<"Error"<<endl; return 0;}
   if(m<=0 || m>=21) {cout<<"Error"<<endl; return 0;}
   for(i=0; i<n; i++) cin>>a[i];
   for(i=0; i<m; i++) cin>>b[i];

   bool found=false;
   for(i=0; i<n; i++)
   {
      bool exist=false;
      for(j=0; j<m; j++)
      {
         if(a[i]==b[j]) {exist=true; break;}
      }
      if(exist) {cout<<a[i]<<" "; found=true;}
   }
   if(!found) cout<<"None"<<endl;

   return 0;
}
```

⇒ Problem 9

Write a C++ program that takes two input integers n and m (assume $1 \leq n \leq 20$ and $1 \leq m \leq 20$), then takes an input array a of n integer values: $a[0], a[1], \ldots, a[n-1]$, then takes another input array b of m integer values: $b[0], b[1], \ldots, b[m-1]$. The program should output all values which exist in array a and do not exist in array b. For example, if the user inputs 3 4 5 2 6 7 4 3 2 which means that $n = 3$, $m = 4$, $a = \{5, 2, 6\}$, $b = \{7, 4, 3, 2\}$, the program should output 5 6 which are the values which exist in array a and do not exist in array b. If all values in array a exist in array b print "None". If the user inputs $n \leq 0$ or $n \geq 21$ print "Error". If the user inputs $m \leq 0$ or $m \geq 21$ print "Error".

Input: 3 4 5 2 6 7 4 3 2 Output: 5 6	Input: 4 3 6 4 3 2 5 2 6 Output: 4 3	Input: 4 5 1 2 3 4 2 4 6 8 10 Output: 1 3	Input: 2 5 3 6 8 6 7 2 1 Output: 3	Input: 3 4 1 2 3 4 3 2 1 Output: None	Input: 3 -4 Output: Error	Input: 25 5 Output: Error

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

int main()
{
   int i, j, n, m;
   int a[20], b[20];
   cin>>n>>m;
   if(n<=0 || n>=21) {cout<<"Error"<<endl; return 0;}
   if(m<=0 || m>=21) {cout<<"Error"<<endl; return 0;}
   for(i=0; i<n; i++) cin>>a[i];
   for(i=0; i<m; i++) cin>>b[i];

   bool found=false;
   for(i=0; i<n; i++)
   {
      bool exist=false;
      for(j=0; j<m; j++)
      {
         if(a[i]==b[j]) {exist=true; break;}
      }
      if(!exist) {cout<<a[i]<<" "; found=true;}
   }
   if(!found) cout<<"None"<<endl;

   return 0;
}
```