**RAJALAKSHMI ENGINEERING COLLEGE**

**RAJALAKSHMI NAGAR, THANDALAM – 602 105**

A logo for a college

Description automatically generated

|  |
| --- |
| **CS23331**  **DESIGN AND ANALYSIS OF ALGORITHM LAB** |
| **Laboratory Observation Note Book** |

A white paper with black dots and blue lines

Description automatically generated with medium confidence

Preethi G

2024-2025

3rd Semester

231501122

2nd Year/ AIML / B

**WEEK 06**

**COMPETITIVE PROGRAMMING**

**1)** **Find Duplicate in Array.**

**Given a read only array of n integers between 1 and n, find one number that repeats.**

**Input Format:**

**First Line - Number of elements**

**n Lines - n Elements**

**Output Format:**

**Element x - That is repeated**

**For example:**

| Input | Result |
| --- | --- |
| 5  1 1 2 3 4 | 1 |

**CODE:**

#include<stdio.h>

int main()

{

int n,i,j;

scanf("%d",&n);

int a[n];

for(i=0;i<n;i++)

scanf("%d",&a[i]);

for(i=0;i<n;i++)

{

for(j=i+1;j<n;j++)

{

if(a[i]==a[j])

printf("%d",a[i]);

}

}

}

**OUTPUT:**

**A screenshot of a computer

Description automatically generated**

**2)** **Find the intersection of two sorted arrays.**

**OR in other words,**

**Given 2 sorted arrays, find all the elements which occur in both the arrays.**

**Input Format**

**·       The first line contains T, the number of test cases. Following T lines contain:**

**1.     Line 1 contains N1, followed by N1 integers of the first array**

**2.     Line 2 contains N2, followed by N2 integers of the second array**

**Output Format**

**The intersection of the arrays in a single line**

**Example**

**Input:**

**1**

**3 10 17 57**

**6 2 7 10 15 57 246**

**Output:**

**10 57**

**Input:**

**1**

**6 1 2 3 4 5 6**

**2 1 6**

**Output:**

**1 6**

**For example:**

| Input | Result |
| --- | --- |
| 1  3 10 17 57  6  2 7 10 15 57 246 | 10 57 |

**CODE:**

#include <stdio.h>

int main() {

int t, n1, n2, i, j;

scanf("%d", &t);

while (t--) {

scanf("%d", &n1);

int a[n1];

for (i = 0; i < n1; i++)

scanf("%d", &a[i]);

scanf("%d", &n2);

int b[n2];

for (j = 0; j < n2; j++) {

scanf("%d", &b[j]);

}

i=0;

j=0;

while(i<n1 &&j<n2)

{

if(a[i]==b[j])

{

printf("%d ",a[i]);

i++;

j++;

}

else if(a[i]<b[j])

i++;

else

j++;

} }

}

**OUTPUT:**

**A screenshot of a computer

Description automatically generated**

**3)** **Given an array A of sorted integers and another non negative integer k, find if there exists 2 indices i and j such that A[j] - A[i] = k, i != j.**

**Input Format:**

**First Line n - Number of elements in an array**

**Next n Lines - N elements in the array**

**k - Non - Negative Integer**

**Output Format:**

**1 - If pair exists**

**0 - If no pair exists**

**Explanation for the given Sample Testcase:**

**YES as 5 - 1 = 4**

**So Return 1.**

**For example:**

| Input | Result |
| --- | --- |
| 3  1 3 5  4 | 1 |

**CODE:**

#include <stdio.h>

int main() {

int n, k, i, j;

scanf("%d", &n);

int a[n];

for(i = 0; i < n; i++)

{

scanf("%d", &a[i]);

}

scanf("%d", &k);

for(i = 0; i < n; i++) {

for(j = i + 1; j < n; j++)

{

if(a[j] - a[i] == k)

{

printf("1\n");

return 0;

}

}

}

printf("0\n");

}

**OUTPUT:**

**A screenshot of a computer

Description automatically generated**