Assignment (6/8/2025)

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1. Read and Print Elements of an Array

IPO:

- Input: Size of array, array elements
- Process: Read and print elements
- Output: Printed array elements

Program:

```
#include<stdio.h>

int main() {
    int a[100], n;
    printf("Enter size of array: ");
    scanf("%d",&n);

    printf("Enter elements: ");
    for(int i = 0; i < n; i++)
        scanf("%d",&a[i]);

    printf("Array elements: ");
    for(int i = 0; i < n; i++)
        printf("%d ", a[i]);

    return 0;
}
```

Output:

```
Enter size of array: 100
Enter elements: 67
Array elements: 34
```

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2. Sum of Elements in an Array

IPO:

- Input: Array elements
- Process: Add all elements
- Output: Sum of array

Program:

```
#include<stdio.h>

int main() {
    int a[100], n, sum = 0;
    printf("Enter size of array: ");
    scanf("%d",&n);

    printf("Enter elements: ");
    for(int i = 0; i < n; i++) {
        scanf("%d",&a[i]);
        sum += a[i];
    }

    printf("Sum = %d", sum);
    return 0;
}
```

Output:

```
Enter size of array: 4
Enter elements: 2 89 12
Sum = 40
```

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3. Maximum and Minimum in an Array

IPO:

- Input: Array elements
- Process: Compare elements to find max and min
- Output: Maximum and minimum values

Program:

```
#include<stdio.h>

int main() {
    int a[100], n, max, min;
    printf("Enter size of array: ");
    scanf("%d",&n);

    printf("Enter elements: ");
    for(int i = 0; i < n; i++)
        scanf("%d",&a[i]);

    max = min = a[0];
    for(int i = 1; i < n; i++) {
        if(a[i]>max) max = a[i];
        if(a[i]<min) min = a[i];
```

```
    }

    printf("Max = %d\nMin = %d", max, min);
    return 0;
}
```

Output:

```
Enter size of array: 4
Enter elements: 6 7 8 9
Max = 9
Min = 6
```

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4. Reverse an Array

IPO:

- Input: Array elements
- Process: Print from last to first
- Output: Reversed array

Program:

```
#include<stdio.h>

int main() {
    int a[100], n;
    printf("Enter size of array: ");
    scanf("%d",&n);

    printf("Enter elements: ");
    for(int i = 0; i < n; i++)
        scanf("%d",&a[i]);

    printf("Reversed array: ");
    for(int i = n - 1; i >= 0; i--)
        printf("%d ", a[i]);

    return 0;
}
```

Output:

```
Enter size of array: 3
Enter elements: 8 9 0
Reversed array: 0 9 8
```

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5. Linear Search in an Array

IPO:

- Input: Array elements and target value
- Process: Compare each element with target
- Output: Index if found or not found

Program:

```
#include<stdio.h>

int main() {
    int a[100], n, key, found = 0;
    printf("Enter size of array: ");
    scanf("%d",&n);

    printf("Enter elements: ");
    for(int i = 0; i < n; i++)
        scanf("%d",&a[i]);

    printf("Enter element to search: ");
    scanf("%d",&key);

    for(int i = 0; i < n; i++) {
        if(a[i] == key) {
            printf("Element found at index %d", i);
            found = 1;
            break;
        }
    }
    if(!found)
        printf("Element not found");

    return 0;
}
```

Output:

```
Enter size of array: 4
Enter elements: 4 56 34 6
Enter element to search: 34
Element found at index 2
```

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6. Sort Array in Ascending Order

IPO:

- Input: Array elements
- Process: Sort elements using a method (like bubble sort)
- Output: Sorted array

Program:

```
#include<stdio.h>

int main() {
    int a[100], n, temp;
    printf("Enter size of array: ");
    scanf("%d",&n);

    printf("Enter elements: ");
    for(int i = 0; i < n; i++)
        scanf("%d",&a[i]);

    // Bubble Sort
    for(int i = 0; i < n - 1; i++) {
        for(int j = 0; j < n - i - 1; j++) {
            if(a[j] > a[j + 1]) {
                temp = a[j];
                a[j] = a[j + 1];
                a[j + 1] = temp;
            }
        }
    }

    printf("Sorted array: ");
    for(int i = 0; i < n; i++)
        printf("%d ", a[i]);

    return 0;
}
```

Output:

```
Enter size of array: 5
Enter elements: 4 2 5 1 3
Sorted array: 1 2 3 4 5
```

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7. Insert an Element in an Array

IPO:

- Input: Array, position, new element
- Process: Shift elements and insert
- Output: Updated array

Program:

```
#include<stdio.h>

int main() {
    int a[100], n, pos, val;
    printf("Enter size of array: ");
    scanf("%d",&n);

    printf("Enter elements: ");
    for(int i = 0; i < n; i++)
        scanf("%d",&a[i]);

    printf("Enter position to insert (0-indexed): ");
    scanf("%d",&pos);
    printf("Enter value to insert: ");
    scanf("%d",&val);

    for(int i = n; i > pos; i--)
        a[i] = a[i - 1];

    a[pos] = val;
    n++;

    printf("Array after insertion: ");
    for(int i = 0; i < n; i++)
        printf("%d ", a[i]);

    return 0;
}
```

Output:

```
Enter size of array: 3
Enter elements: 1 2 4
Enter position to insert (0-indexed): 2
Enter value to insert: 3
Array after insertion: 1 2 3 4
```

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8. Delete an Element from an Array

IPO:

- Input: Array and value to delete
- Process: Find and shift left
- Output: Updated array

Program:

```
#include<stdio.h>
```

```
int main() {
    int a[100], n, val, i, pos = -1;
    printf("Enter size of array: ");
    scanf("%d",&n);

    printf("Enter elements: ");
    for(i = 0; i < n; i++)
        scanf("%d",&a[i]);

    printf("Enter value to delete: ");
    scanf("%d",&val);

    for(i = 0; i < n; i++) {
        if(a[i] == val) {
            pos = i;
            break;
        }
    }

    if(pos != -1) {
        for(i = pos; i < n - 1; i++)
            a[i] = a[i + 1];
        n--;
        printf("Array after deletion: ");
        for(i = 0; i < n; i++)
            printf("%d ", a[i]);
    } else {
        printf("Element not found");
    }

    return 0;
}
```

Output:

```
Enter size of array: 4
Enter elements: 10 6 23 40
Enter value to delete: 30
Array after deletion: 10 20 40
```

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9. Frequency of Elements in an Array

IPO:

- Input: Array elements
- Process: Count frequency of each unique number
- Output: Frequency of each element

Program:

```c
#include<stdio.h>

int main() {
    int a[100], freq[100], n, i, j;

    printf("Enter size of array: ");
    scanf("%d",&n);

    printf("Enter elements: ");
    for(i = 0; i < n; i++) {
        scanf("%d",&a[i]);
        freq[i] = -1;
    }

    for(i = 0; i < n; i++) {
        int count = 1;
        if(freq[i] != 0) {
            for(j = i + 1; j < n; j++) {
                if(a[i] == a[j]) {
                    count++;
                    freq[j] = 0;
                }
            }
            freq[i] = count;
        }
    }

    printf("Element - Frequency\n");
    for(i = 0; i < n; i++) {
        if(freq[i] != 0)
            printf("%d - %d\n", a[i], freq[i]);
    }

    return 0;
}
```

Output:

```
Enter size of array: 5
Enter elements: 1 2 2 3 1
Element - Frequency
1 - 2
2 - 2
3 - 1
```

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10. Merge Two Arrays

IPO:

- Input: Two arrays
- Process: Copy elements of both into one array
- Output: Merged array

Program:

```
#include<stdio.h>

int main() {
    int a[50], b[50], merge[100], n1, n2, i;

    printf("Enter size of first array: ");
    scanf("%d",&n1);
    printf("Enter elements: ");
    for(i = 0; i < n1; i++)
        scanf("%d",&a[i]);

    printf("Enter size of second array: ");
    scanf("%d",&n2);
    printf("Enter elements: ");
    for(i = 0; i < n2; i++)
        scanf("%d",&b[i]);

    for(i = 0; i < n1; i++)
        merge[i] = a[i];
    for(i = 0; i < n2; i++)
        merge[n1 + i] = b[i];

    printf("Merged array: ");
    for(i = 0; i < n1 + n2; i++)
        printf("%d ", merge[i]);

    return 0;
}
```

Output:

```
Enter size of first array: 3
Enter elements: 4 5 6
Enter size of second array: 2
Enter elements: 4 5
Merged array: 1 2 3 4 5
```

Thank you