

Arrays and Strings in Pseudocode

Array and string questions are common because they test indexing and loop control.

Array basics

Array stores multiple values under one name.

Example:

```
A = [3, 5, 7, 9]
```

If 0-indexed:

- $A[0] = 3$
- $A[1] = 5$
- $A[2] = 7$
- $A[3] = 9$

If 1-indexed:

- $A[1] = 3$
- $A[2] = 5$
- $A[3] = 7$
- $A[4] = 9$

Always check indexing in the question.

Array sum

```
SET sum = 0
FOR i = 0 TO n-1
    SET sum = sum + A[i]
END FOR
DISPLAY sum
```

Maximum element

```
SET max = A[0]
FOR i = 1 TO n-1
    IF A[i] > max THEN
        SET max = A[i]
    END IF
```

```
END FOR
DISPLAY max
```

Count even numbers

```
SET count = 0
FOR i = 0 TO n-1
    IF A[i] % 2 = 0 THEN
        SET count = count + 1
    END IF
END FOR
DISPLAY count
```

Reverse array output

```
FOR i = n-1 DOWNT0 0
    DISPLAY A[i]
END FOR
```

String basics

String is a sequence of characters.

Example:

```
S = "CODE"
```

If 0-indexed:

- $S[0] = C$
- $S[1] = O$
- $S[2] = D$
- $S[3] = E$

Palindrome string

String is palindrome if it reads same forward and backward.

```
SET i = 0
SET j = length(S) - 1
SET flag = true
WHILE i < j
    IF S[i] != S[j] THEN
        SET flag = false
```

```
BREAK
END IF
SET i = i + 1
SET j = j - 1
END WHILE
DISPLAY flag
```

Examples:

- MADAM: palindrome
- LEVEL: palindrome
- CODE: not palindrome

Character frequency

Concept:

- Use count array/map.
- Increment count for each character.

Pseudocode:

```
FOR each character ch in S
    count[ch] = count[ch] + 1
END FOR
```

Common array/string traps

- Accessing `A[n]` in 0-indexed array is out of bounds.
- Loop `i <= n` is wrong for 0-indexed array of size n.
- In string comparison, case matters: `A` and `a` are different.
- Space may be counted as character if not explicitly ignored.