

ASSIGNMENT-3

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1. Pointers and Arrays in Weather Data Analysis

A weather monitoring system stores temperature readings in an array and uses pointers for processing.

Parameters:

- * Temperature data is stored dynamically in an array.

- * Operations include finding max, min and average temperatures.

Questions:

- a) Implement a function to find max, min and average temperature using pointers.

- b) Implement a function to sort temperature reading using pointer-based sorting.

- c) Compare pointer arithmetic vs array indexing for accessing elements.

- d) Discuss the impact of using dynamic memory allocation in large datasets.

a) Function to find Max, min, average using pointers.

```
#include <stdio.h>

void analyzeTemp(int *t, int n)
{
    int i, max, min, sum = 0;
    max = min = *t;
    for (i = 0; i < n; i++)
    {
        if (*t + i) > max)
            max = *t + i;
        if (*t + i) < min)
            min = *t + i;
        sum += *t + i;
    }
    printf("Max = %.d\n", max);
    printf("Min = %.d\n", min);
    printf("Average = %.2f\n", (float)sum/n);
}

int main()
{
    int temp[] = {25, 30, 28, 35, 27};
    int n = 5
    analyzeTemp(temp, n);
    return 0;
}
```

b) Function to sort temperature using pointers.

```
#include <stdio.h>
void sortTemp(int *t, int n)
{
    int i, j, temp;
    for (i=0; i<n-1; i++)
    {
        for (j=0; j<n-i-1; j++)
        {
            if (*t+i) > *t+j+1)
            {
                temp = *t+i;
                *t+i = *t+j+1;
                *t+j+1 = temp;
            }
        }
    }
}

int main()
{
    int t[5] = {25, 30, 26, 35, 27};
    int n = 5, i;
    sortTemp(t, n);
    for (i=0; i<n; i++)
        printf("%d", *t+i);

    return 0;
}
```

c) Pointer arithmetic vs Array indexing .

Comparison Table :

| Feature | Pointer Arithmetic | Array Indexing |
|---------------|--------------------|-----------------|
| Syntax | $*(\text{pt} + i)$ | $a[i]$ |
| Speed | Slightly faster | slightly slower |
| Memory access | Direct | Indirect |
| Readability | less readable | more readable |

d) Impact of Dynamic Memory Allocation in Large datasets.

- * Saves memory by allocating only required size.
- * Useful for large weather datasets.
- * Allows runtime resizing.
- * Improves flexibility.

Disadvantages:

- * Memory leak if free() not used.
- * Slightly slower than static arrays.