SESSION 7 - STRINGS

Chapter 1: What is a String?

In C, there is no specific "String" data type. A string is simply **a 1D array of characters** terminated by a special character called the **Null Character** ('\0').

Visual Representation:

String: "HELLO"

H	**E**	**L**	**L**	**O**	**\0**
str[0]	str[1]	str[2]	str[3]	str[4]	str[5]

Declaration:

C

```
char name[] = "Gemini"; // Compiler adds '\0' automatically

char name[10] = {'G','e','m','i','n','i','\0'}; // Manual
```

Critical Concept: The \0 tells functions like printf where the string ends. Without it, the program keeps reading memory until it crashes.

Chapter 2: String Functions (<string.h>)

Function	**Purpose**	**Example**
strlen(s)	Returns length (excluding \0)	strlen("Hi") -> 2
strcpy(dest, src)	Copies source to destination	strcpy(s1, "Hi")
strcmp(s1, s2)	Compares two strings	Returns 0 if equal
strcat(s1, s2)	Concatenates (joins) strings	"He" + "llo" = "Hello"

Chapter 3: Activities & Manual Logic

Activity: Copy String WITHOUT strcpy

This helps you understand how strings work at the byte level.

C

```
#include <stdio.h>


void myStrcpy(char source[], char dest[]) {
```

```
    int i = 0;
    while (source[i] != '\0') {
        dest[i] = source[i]; // Copy char by char
        i++;
    }
    dest[i] = '\0'; // IMPORTANT: Close the string!
}

int main() {
    char s1[] = "Physics";
    char s2[20]; // Make sure size is big enough
    myStrcpy(s1, s2);
    printf("Copied string: %s", s2);
    return 0;
}
```

Practice: Reverse a String

C

```
void reverseString(char s[]) {
    int len = 0;
    while(s[len] != '\0') len++; // Calculate length manually

    int start = 0, end = len - 1;
    while(start < end) {
        char temp = s[start];
        s[start] = s[end];
        s[end] = temp;
        start++;
        end--;
    }
}
```

Chapter 4: Frequently Asked Questions

Q1: Why can't I do string1 = string2?

Answer: Arrays in C cannot be assigned directly using =. You are trying to change the memory address of the array, which is constant. You must copy element by element (or use strcpy).

Q2: What is the difference between 'A' and "A"?

Answer:

- 'A' is a character literal (type char).
- "A" is a string literal (type char array), which contains 'A' followed by \0.

Q3: How to read a string with spaces?

Answer: scanf("%s", name) stops at space. Use gets(name) (unsafe) or better, fgets(name, size, stdin) to read a full line including spaces.