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Library Functions in C

Math Functions, String Handling, and Miscellaneous Functions

Overview of Library Functions:

- Essential functions provided by C's standard library
- Helps in performing common operations efficiently
- Categories:
  - Math Functions
  - String Handling Functions
  - Miscellaneous Functions

Difference Between < > and " " in #include

Angle Brackets (< >)

- Syntax: #include <file.h>
- Used for: Standard library or system headers
- Search Path: Predefined system directories

Double Quotes (" ")

- Syntax: #include "file.h " Used for: User-defined or local headers
- Search Path: Current file directory first, then standard directories

Math Functions

- Header File: <math.h>
- Common Functions:
  - sqrt(double x) – Returns the square root of x.
  - pow(double base, double exponent) – Returns base raised to the power of exponent.
  - exp(double x) – Returns e raised to the power of x.
  - log(double x) – Returns the natural logarithm (base e) of x.
  - sin(double x), cos(double x), tan(double x) – Trigonometric functions.

Math Functions Examples

```
#include <stdio.h>
#include <math.h>
int main() {
   double x = 9.0;
   printf("Square root of %.2f is %.2f\n", x,
sqrt(x));
   printf("2^3 is %.2f\n", pow(2.0, 3.0));
   return 0;
}
```

Demonstrates how to use sqrt and pow functions.

String Handling Functions

- Header File: <string.h>
- Common Functions:
  - strlen(const char *str) – Returns the length of the string str.
  - strcmp(const char *str1, const char *str2) – Compares two strings.
  - strcpy(char *dest, const char *src) – Copies the string src to dest.
  - strcat(char *dest, const char *src) – Concatenates src to the end of dest.
  - strchr(const char *str, int c) – Finds the first occurrence of character c in str.

String Handling Functions Examples

```
#include <stdio.h>
#include <string.h>
int main() {
   char str1[50] = "Hello";
   char str2[50] = "World";
   strcat(str1, " ");
   strcat(str1, str2);
   printf("Concatenated string: %s\n", str1);
      printf("Length of str1: %lu\n", strlen(str1));
   return 0;
}
```

Shows usage of strcat and strlen.

Miscellaneous Functions

- Common Functions:
  - getchar() – Reads a single character from standard input.
  - putchar(int char) – Writes a single character to standard output.
  - malloc(size_t size) – Allocates size bytes of memory and returns a pointer to it.
  - calloc(size_t num, size_t size) – Allocates memory for an array of num elements of size bytes each, initializing all bytes to zero.

Miscellaneous Functions Examples

```
#include <stdio.h>
#include <stdlib.h>
int main() {
    char c;
    printf("Enter a character:");
    c = getchar();
    printf("You entered: ");
    putchar(c);
    printf("\n");
    int *arr = (int*)malloc(5 *
sizeof(int));
    if (arr == NULL) {
        printf("Memory allocation
    failed\n");
        return 1;
    }
    for (int i = 0; i < 5; i++) {
         arr[i] = i + 1;
printf("%d ", arr[i]);    }
    printf("\n");
    free(arr);
    return 0;
}
```

SUMMARY

- **Recap:**
  - Math functions for mathematical operations.
  - String handling functions for managing strings.
  - Miscellaneous functions for input/output and dynamic memory allocation.
- **Importance:**
  - Using these functions effectively improves code efficiency and readability.

THANK YOU