C Programming Language Reference Sheet

Comments:

```
// This is a single-line comment
/* This is a
   multi-line comment */
```

Include Header Files:

```
#include <stdio.h> // Standard I/O
#include <stdlib.h> // Standard library
```

Main Function:

```
int main()
{
    // Your code goes here
    return 0; // Program termination
}
```

Data Types:

- int: Integer
- float: Floating-point
- double: Double-precision floating-point
- char: Character
- short: Short integer
- long: Long integer
- unsigned: Unsigned integer
- _Bool: Boolean (0 or 1)

Variables:

```
int age = 25; // Declaration and initialization
```

Input/Output:

```
printf("Hello, World!\n"); // Output
scanf("%d", &age); // Input
```

Operators:

- Arithmetic: +, -, *, /, %
- Comparison: ==, !=, <, >, <=, >=
- Logical: && (and), || (or), ! (not)
- Assignment: =, +=, -=, *=, /=
- Increment/Decrement: ++, --
- Ternary: (condition) ? true_expression : false_expression

Control Flow:

- if, else if, else: Conditional statements
- while: Loop
- for: Loop with initialization, condition, and increment
- switch: Multiway branching

Functions:

```
int add(int a, int b)
{
   return a + b;
}
```

Arrays:

```
int numbers[5]; // Declaration
numbers[0] = 1; // Initialization
int numbers[] = {1, 2, 3, 4, 5}; // Declaration and initialization
```

Pointers:

```
int* ptr; // Pointer declaration
ptr = &age; // Pointer assignment
*ptr = 30; // Dereferencing
```

Structures:

```
struct Student
{
   char name[50];
   int age;
};
```

Enums:

enum Color { RED, GREEN, BLUE };

Preprocessor Directives:

#define PI 3.141592
#include "header.h"

Memory Allocation:

- malloc(), calloc(), realloc(): Dynamic memory allocation
- free(): Release allocated memory

Standard Libraries:

- math.h: Mathematical functions
- string.h: String manipulation
- stdlib.h: Standard library functions

Compile and Execute (gcc):

$ gcc your_program.c -o your_program
$ ./your_program