Introduction to Functions

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Outline

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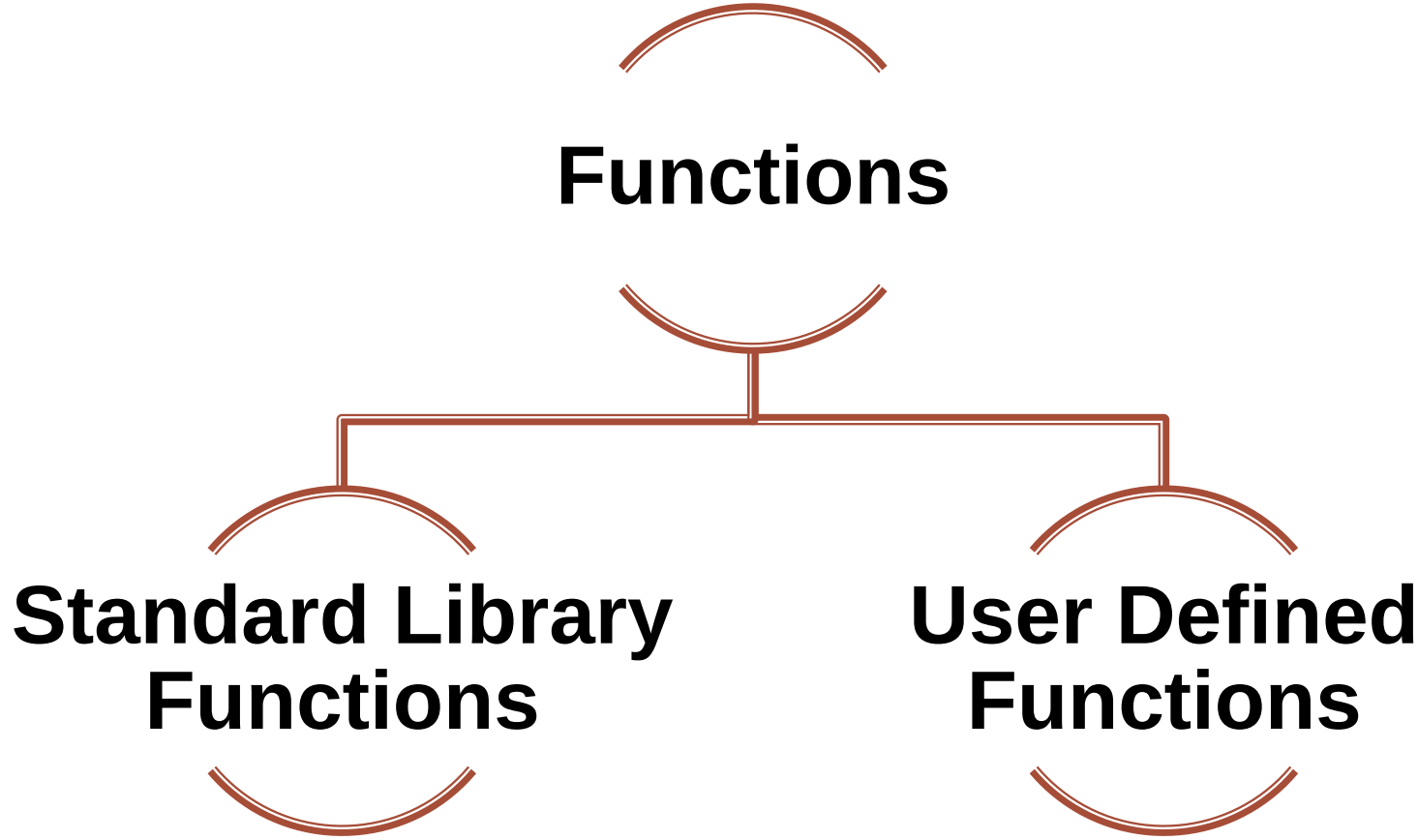
Introduction to Functions

- A function is a group of statements that together perform a task.
- Every C program has at least one function, which is **main()**, and all the most trivial programs can define additional functions.
- You can divide up your code into separate functions.
- Suppose, you need to create a program to create a circle and color it. You can create two functions to solve this problem:
  - create a circle function
  - create a color function
- Dividing a complex problem into smaller chunks makes our program easy to understand and reuse.

Types of Functions



Standard Library Functions

- C Standard library functions or simply C Library functions are inbuilt functions in C programming.
- The prototype and data definitions of these functions are present in their respective header files.
- To use these functions we need to include the header file in our program.

Standard Library Functions

- For example, If you want to use the printf() function, the header file <stdio.h> should be included.

```c
#include <stdio.h>
int main()
{
   printf("Catch me if you can.");
}
```

- If you try to use printf() without including the stdio.h header file, you will get an error.

Advantages of Using C library functions

- **They work:** One of the most important reasons you should use library functions is simply because they work. These functions have gone through multiple rigorous testing and are easy to use.
- **The functions are optimized for performance:** Since, the functions are "standard library" functions, a dedicated group of developers constantly make them better. In the process, they are able to create the most efficient code optimized for maximum performance.

Advantages of Using C library functions

- **It saves considerable development time:** Since the general functions like printing to a screen, calculating the square root, and many more are already written. You shouldn't worry about creating them once again.
- **The functions are portable:** With ever-changing real-world needs, your application is expected to work every time, everywhere. And, these library functions help you in that they do the same thing on every computer.

Example

- **Square root using sqrt() function**
  - Suppose, you want to find the square root of a number.
  - To compute the square root of a number, you can use the sqrt() library function.
  - The function is defined in the math.h header file.

```c
#include <stdio.h>
#include <math.h>
int main()
{
   float num, root;
   printf("Enter a number: ");
   scanf("%f", &num);

   // Computes the square root of num and stores in root.
   root = sqrt(num);

   printf("Square root of %.2f = %.2f", num, root);
   return 0;
}
```

Example

- When you run the program, the output will be:

```
Enter a number: 12
Square root of 12.00 = 3.46
```

C Library Functions

- The Standard Function Library in C is a huge library of sub-libraries, each of which contains the code for several functions.
- Here are some header files with descriptions:

Header File	Description
stdio.h	It is a standard i/o header file in which Input/output functions are declared
conio.h	This is a console input/output header file.
string.h	All string related functions are in this header file.
stdlib.h	This file contains common functions which are used in the C programs.
math.h	All functions related to mathematics are in this header file.
time.h	This file contains time and clock related functions.Built functions in stdio.h

References URL:

- https://www.geeksforgeeks.org/c-library-functions/
- https://web.stanford.edu/class/archive/cs/cs107/cs107.1232/guide/stdlib.html
- https://www.ibm.com/docs/en/i/7.3?topic=extensions-standard-c-library-functions-table-by-name

THANK YOU

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