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Introduction to Functions

ELEC1006: ENGINEERING COMPUTING

Modular Programming & Functions

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- Modular programming: Break a program up into smaller, manageable functions or modules.
- Function: A collection of statements to perform a task.
- Motivation for modular programming:
  - Improves maintainability of programs.
  - Simplifies the process of writing programs.

This program has one long, complex function containing all of the statements necessary to solve a problem.

```
int main()
{
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
   statement;
}
```

In this program the problem has been divided into smaller problems, each of which is handled by a separate function.

```
int main()
{
   statement;
   statement;
   statement;
}
```

main function

```
void function2()
{
   statement;
   statement;
   statement;
}
```

function 2

```
void function3()
{
   statement;
   statement;
   statement;
}
```

function 3

```
void function4()
{
   statement;
   statement;
   statement;
}
```

function 4

Defining & Calling Functions

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- Function call: A statement that causes a function to execute.
- Function definition: Statements that make up a function.

Function Definition

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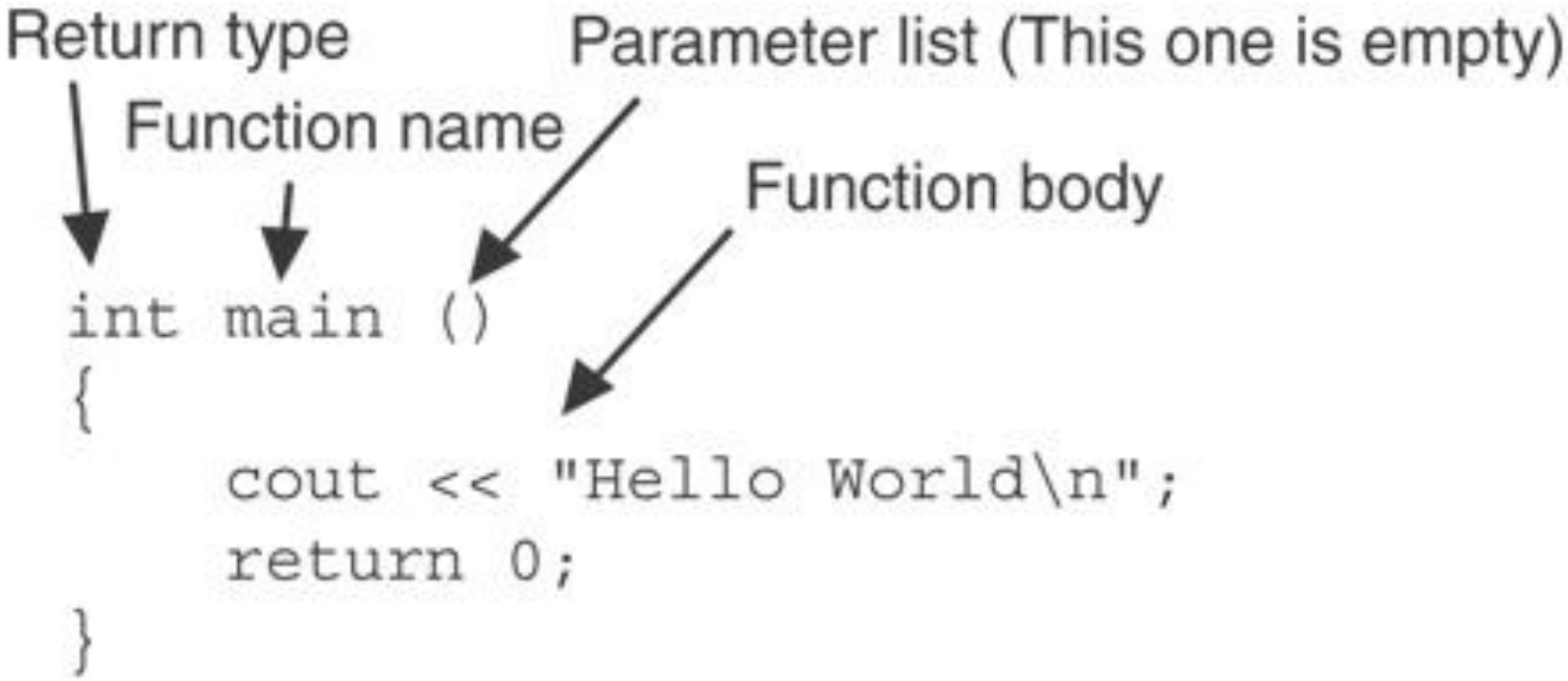
- Definition includes:
  - Name: Function names follow same rules as variables.
  - Parameter list: Variables containing values passed to the function.
  - Body: Statements that perform the function's task, enclosed in { } .
  - Return type: Data type of the value that function returns to the part of the program that called it.

main() Function



Note: The line that reads `int main()` is the function header.

Function Return Type

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- If a function returns a value, the type of the value must be indicated:

```
int main()
{
        cout << "Hello World!\n";
        return 0;
}
```

- If a function does not return a value, its return type is `void`:

```
void main()
{
        cout << "Hello World!\n";
}
```

More info

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[1] cplusplus.com: Functions
https://cplusplus.com/doc/tutorial/functions/

[2] learncpp.com: 2.1 – Introduction to Functions
https://www.learncpp.com/cpp-tutorial/introduction-to-functions/