Introduction to C

Reference

- Teach Yourself C
  - Herbert Schildt
- The C Programming Language
  - Brian W. Kernighan
  - Dennis M. Ritchie

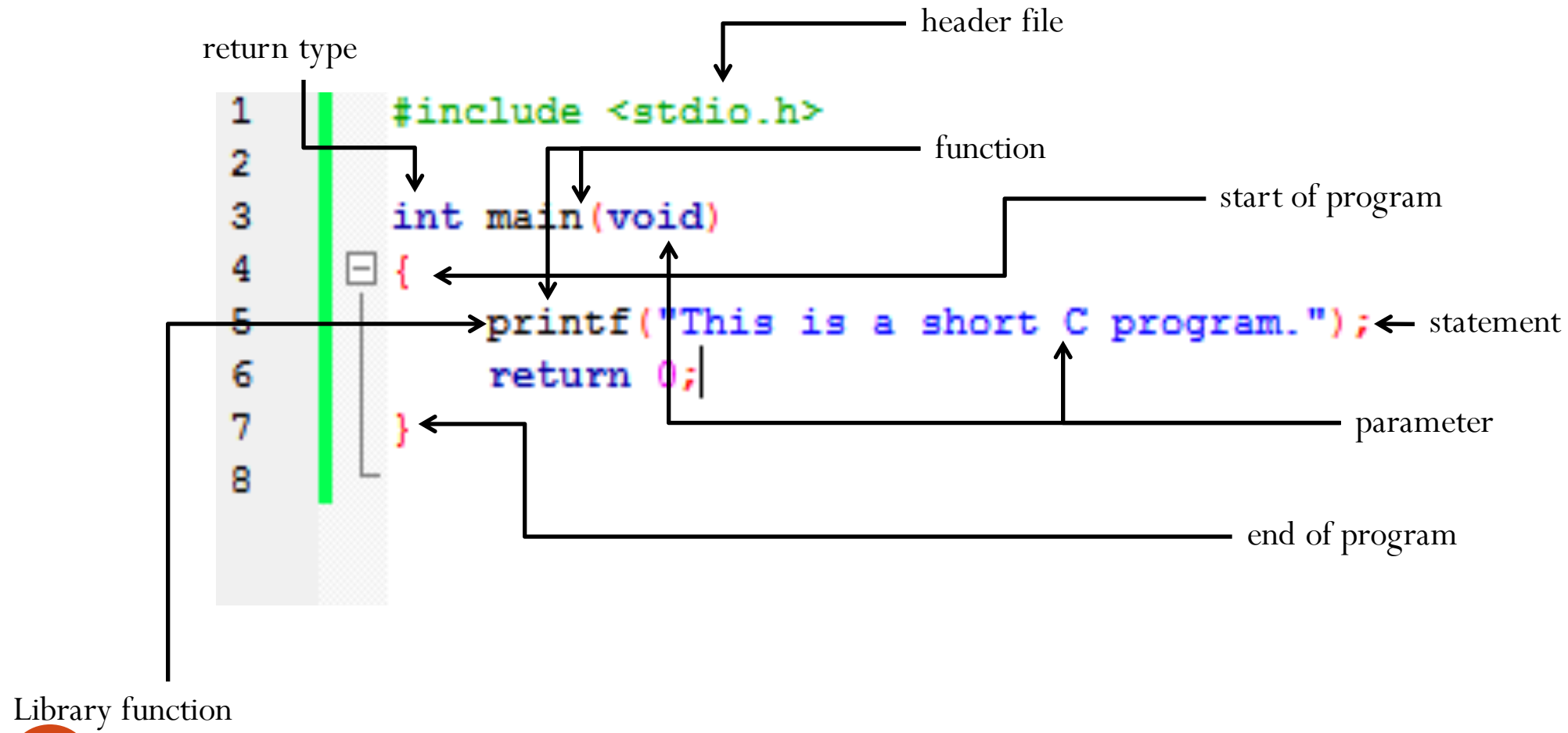
Why Programming Language?

- To communicate with a machine/computer
- Robotics
- Microcontrollers: automobiles and airplanes
- Embedded processors: phones, portable electronics
- DSP (Digital Signal Processing) processors: digital audio and TV systems

About C

- C was originally developed by Dennis Ritchie between 1969 and 1973 at Bell Labs
- C was used to re-implement the Unix operating system
- It has since become one of the most widely used programming languages of all time
- C has been standardized by the American National Standards Institute (ANSI) since 1989 (ANSI C) and subsequently by the International Organization for Standardization (ISO)

A first look at C



A first look at C

```
#include <stdio.h>
int main()
{
        printf("This is a short C program");
        return 0;
}
```

include

- # symbol indicates a preprocessor
- It means it has to be done before compilation
- #include to include the contents of the header file

A first look at C

```
# include <stdio.h>
int main()
{
        printf("This is a short C program");
        return 0;
}
```

<stdio.h>

- Name of the header file
- Header files: constants, functions, other declarations
- You must know which header you need
- Use help and documentation to find out

A first look at C

```
# include <stdio.h>
int main()
{
        printf("This is a short C program");
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}
```

<stdio.h>

- Enclosed in < > (header in default place)
- May be enclosed in " " (header is in the same folder as the source)
- stdio.h : standard input/output header file
  - Needed for the function: printf()

A first look at C

```
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```

main

- Every C program must have a 'main' function
- Program starts from the 1st line in 'main'
- Parameter type none or void
- Return type int

int main()

A first look at C

```
# include <stdio.h>
int main()
{
        printf("This is a short C program");
        return 0;
}
```

{ } curly braces

- The curly braces are like containers
- The code between two braces are called a *block*
- Missing either brace will generate compile error

A first look at C

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# include <stdio.h>
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        return 0;
}
```

{ } curly braces

- Left curly brace {
  - Begin the body of function
- Right Curly brace }
  - End of the function

A first look at C

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# include <stdio.h>
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}
```

printf

- A function given in stdio.h
- Prints the text given as the parameter

A first look at C

```
# include <stdio.h>
int main()
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        printf("This is a short C program");
        return 0;
}
```

; (semicolon)

- Every C statement must end with a ;
- Otherwise compiler will generate an error
  - Statement Missing

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```
# include <stdio.h>
int main()
{
        printf("This is a short C program");
        return 0;
}
```

return 0

- Indicate how the program exited
  - return 0 means that execution was successful and there was no error.
  - abnormal termination is usually signaled by a non-zero return
  - but there is no standard for how non-zero codes are interpreted.

When a program is called by another program

A first look at C

```
1  #include <stdio.h>
2
3  int main()
4  {
5      printf("This is a short C program.");
6      return 0;
7  }
```

Programming Tools

- Compiler
- Standard Library
- Help files & documentations
- IDE

Compilers

- What does it do?
  - Match syntax
  - Find Errors
  - Prepare object code
    - instructions in a computer language, usually a machine code

Standard Library

- What does it do?
  - Provide implementations of some basic and important functions
  - Usually these functions are very efficient
  - Programmers should use library functions to improve performance and portability

IDE - Integrated Development Environment

- Helps to Write
  - Use different color to highlight different type of code
  - Sometimes shows hints
- Helps to Compile
- Helps to Run
- Helps to Debug

Help Files and Documentation

- Provide details about
  - Syntax
  - Keywords
  - Library functions
  - Examples
  - Etc.

Acknowledgement

- Thanks to Johra Muhammad Moosa, Assistant Professor, CSE, BUET for the initial slides.
- Thanks to Wikipedia for the history of C.