CS F111: Computer Programming

(Second Semester 2021-22)

Lect 3: Algorithms

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Hello World Program

```c
// Simple C program to display "Hello World"

// Header file for input output functions
#include <stdio.h>

// main function -
// where the execution of program begins
int main()
{

    // prints hello world
    printf("Hello World");

    return 0;
}
```
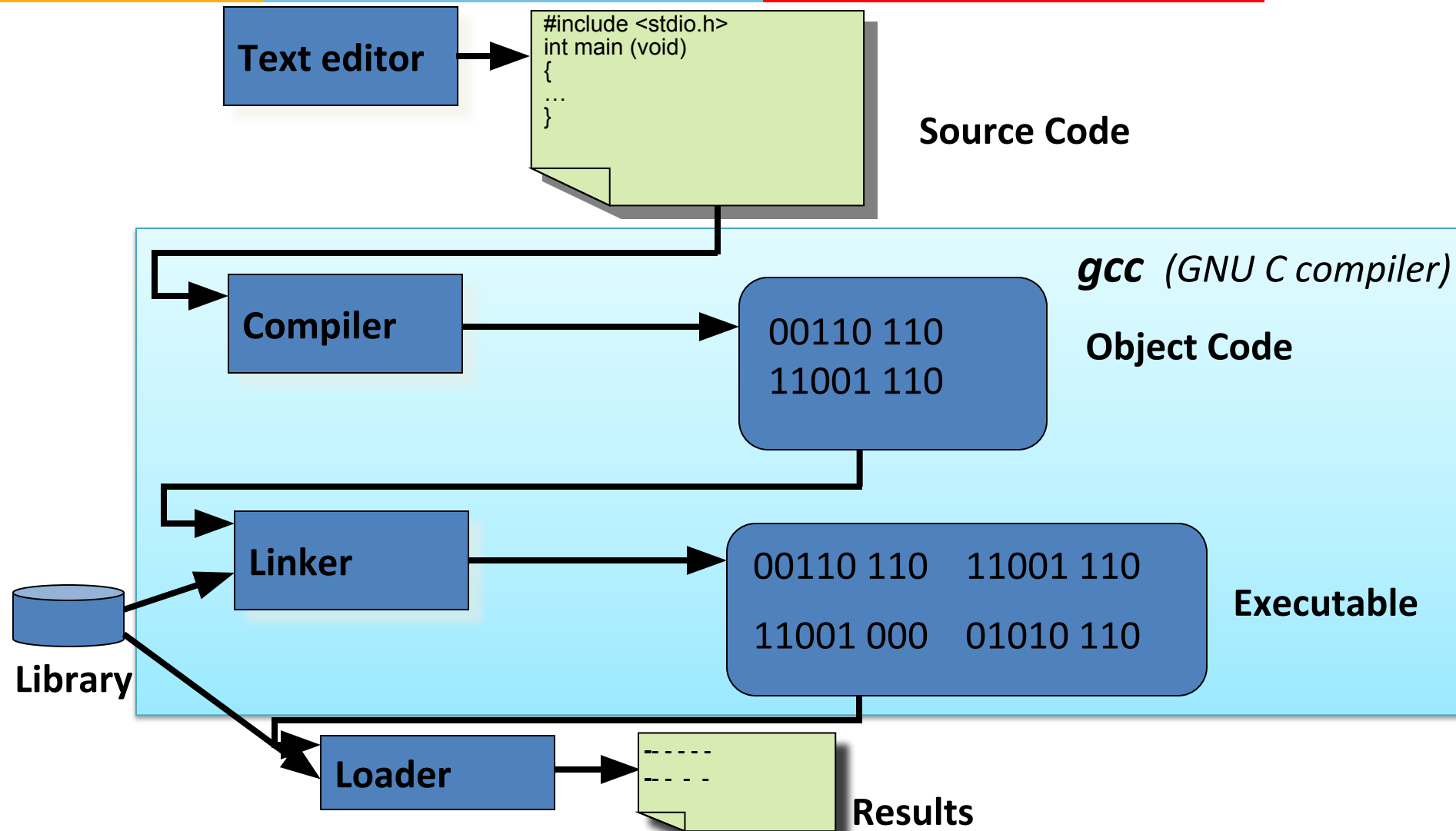
Next Class: How to take input, store in memory and print numbers from the memory
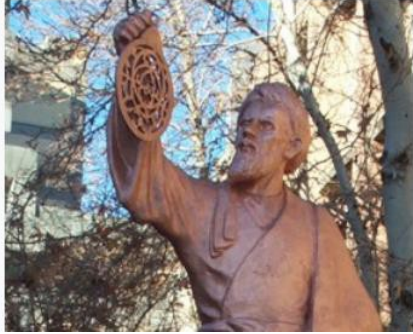
Some programmer Components

- **Some words that will be used a lot:**
  - **Source code: The stuff you type into the computer, i.e., the program you are writing.**
  - **Compile (build): Taking source code and making a program that the computer can understand (*gcc in this course*).**
  - **Executable: The compiled program that the computer can run.**
  - **Library: Added functions for C programming which are required to do certain tasks.**
  - **Header file: Files ending in .h which are included at the start of source code, shared between several source code files, typically provided by the compiler.**

Creating and Running C Programs

Text editor →

```
#include <stdio.h>
int main (void)
{
…
}
```

Source Code

gcc *(GNU C compiler)*

Compiler →

```
00110 110
11001 110
```

Object Code

Linker →

```
00110 110    11001 110

11001 000    01010 110
```

Executable

Library

Loader →

```
- - - - -
- - - -
- - - -
```

Results

Algorithms

Muḥammad ibn Mūsā al-Khwārizmī

RAJIV GANDHI INTERNATIONAL AIRPORT

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Analogies

Input List

Algorithm

A step-by-step method for
solving a problem or doing a task

Output List

Definition: An ordered and finite set of operations that must be followed in order to solve a problem.

More complex ones: Page rank from Google, Facebook Timeline etc.

Characteristics of an Algorithm

- Clear and Unambiguous (TSRTC stand at Shamshabad)
- Well defined input (Arrived with baggage and enough money in the pocket)
- Well defined output (Campus GATE is Open on that day)
- Finiteness (Not roaming around the city for next 5 days or so...)
- Feasible (Should not expect a Flying scooter to be available at Secunderabad)
- Language independent (No Spanish, say)