Data Structures

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C Fundamentals

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Department of Computer Science and Engineering
Shiv Nadar University

Last Class Summary

- **Introduction to C**
- **Language**

Language

	English	C
Alphabet	A-Z, a-z	A-Z, a-z
Numbers	0-9	0-9, 0 and 1, 0-7, 0-F
Words	Words	Tokens
Sentences	Grammar + Words = Sentences	Syntax + Tokens = Statements
Paragraph	Paragraph	Block
Chapter/Book	Chapter/Book	Program
Library	Library	Library

Introduction to Number Systems

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Decimal	Binary	Octal	Hexadecimal
0			
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

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Introduction to Number Systems

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Decimal	Binary	Octal	Hexadecimal
0	00		
1	01		
2	10		
3	11		
4	100		
5	101		
6	110		
7	111		
8	1000		
9	1001		
10	1010		
11	1011		
12	1100		
13	1101		
14	1110		
15	1111		

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Introduction to Number Systems

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Decimal	Binary	Octal	Hexadecimal
0	00	0	
1	01	1	
2	10	2	
3	11	3	
4	100	4	
5	101	5	
6	110	6	
7	111	7	
8	1000	10	
9	1001	11	
10	1010	12	
11	1011	13	
12	1100	14	
13	1101	15	
14	1110	16	
15	1111	17	

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Introduction to Number Systems

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Decimal	Binary	Octal	Hexadecimal
0	00	0	0
1	01	1	1
2	10	2	2
3	11	3	3
4	100	4	4
5	101	5	5
6	110	6	6
7	111	7	7
8	1000	10	8
9	1001	11	9
10	1010	12	A
11	1011	13	B
12	1100	14	C
13	1101	15	D
14	1110	16	E
15	1111	17	F

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Questions?

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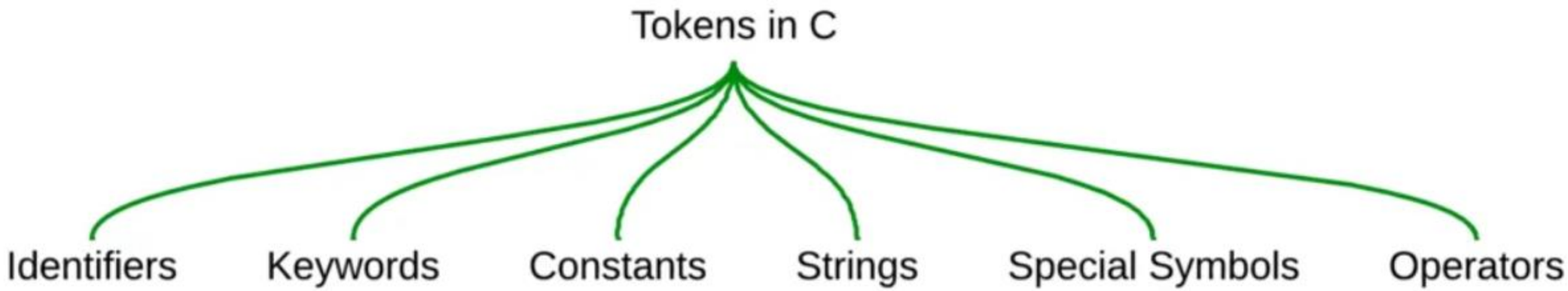
Tokens

- **Tokens – Smallest unit in a program**

Types of Tokens

- **Tokens – Smallest unit in a program**
  - **Identifiers**
  - **Keywords**
  - **Constants a.k.a., Literals**
  - **Strings**
  - **Special Symbols or Special Characters**
  - **Operators**



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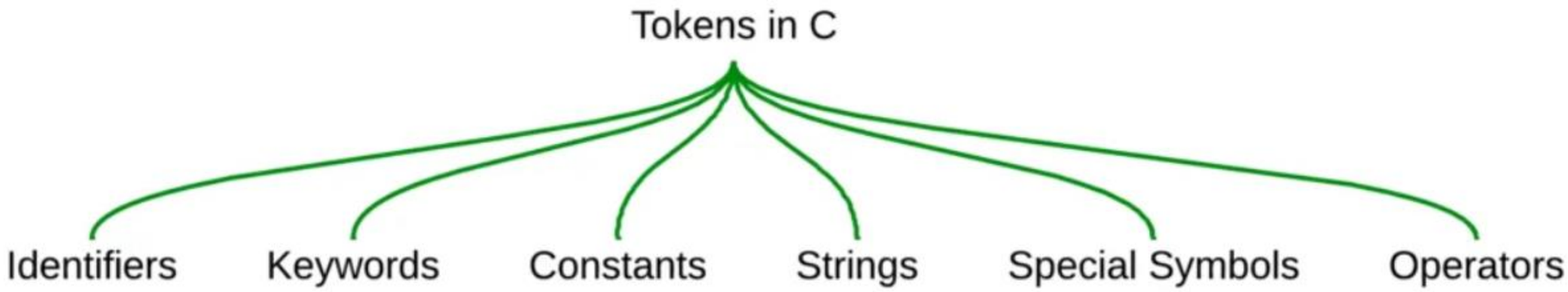
Types of Tokens

- **Tokens – Smallest unit in a program**
  - **Identifiers**
  - **Keywords - 32**
  - **Constants a.k.a., Literals**
  - **Strings**
  - **Special Symbols or Special Characters**
  - **Operators**



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Visual Studio Code

- **Code Editor**
  - **Coding**
  - **Debugging**
- **Web and Cloud Applications**

Visual Studio Code

- **Open Folder**
- **Program file**
- **Terminal**

Visual Studio Code

- **Open Folder**
- **Program file**
  - **C files are saved with .c extension**
- **Terminal**

Visual Studio Code

- **Demo – First Code**

```
void main()
{
}
```

Visual Studio Code

- **Demo – First Code**

```
void main()
{
}
```

Keywords

main	void				

Special Characters

()	{}			

Compiler and Linker

- **Software Programs**
- **Compiler - People Language Analogy**

Compiler and Linker

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- **Software Programs**
- **People Language Analogy**
- **Machine (Binary) <=> Operating System (Object Codes) <=> C program (Humans)**

Compiler and Linker

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Compiler and Linker

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- **Compiler and Linker – Between OS and C Program**
- **Compilation Command**
  - **gcc filename.c**

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    - **Creates a.out (Ubuntu) and a.exe (Windows)**

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  - **gcc filename.c**
    - **Creates a.out (Ubuntu) and a.exe (Windows)**
  - **gcc filename.c -o obj**
    - **Creates obj.out (Ubuntu) and obj.exe (Windows)**

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Compiler and Linker

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  - **gcc filename.c -o obj**
    - **Creates obj.out (Ubuntu) and obj.exe (Windows)**
- **Compilation fails => Compile Time Error**

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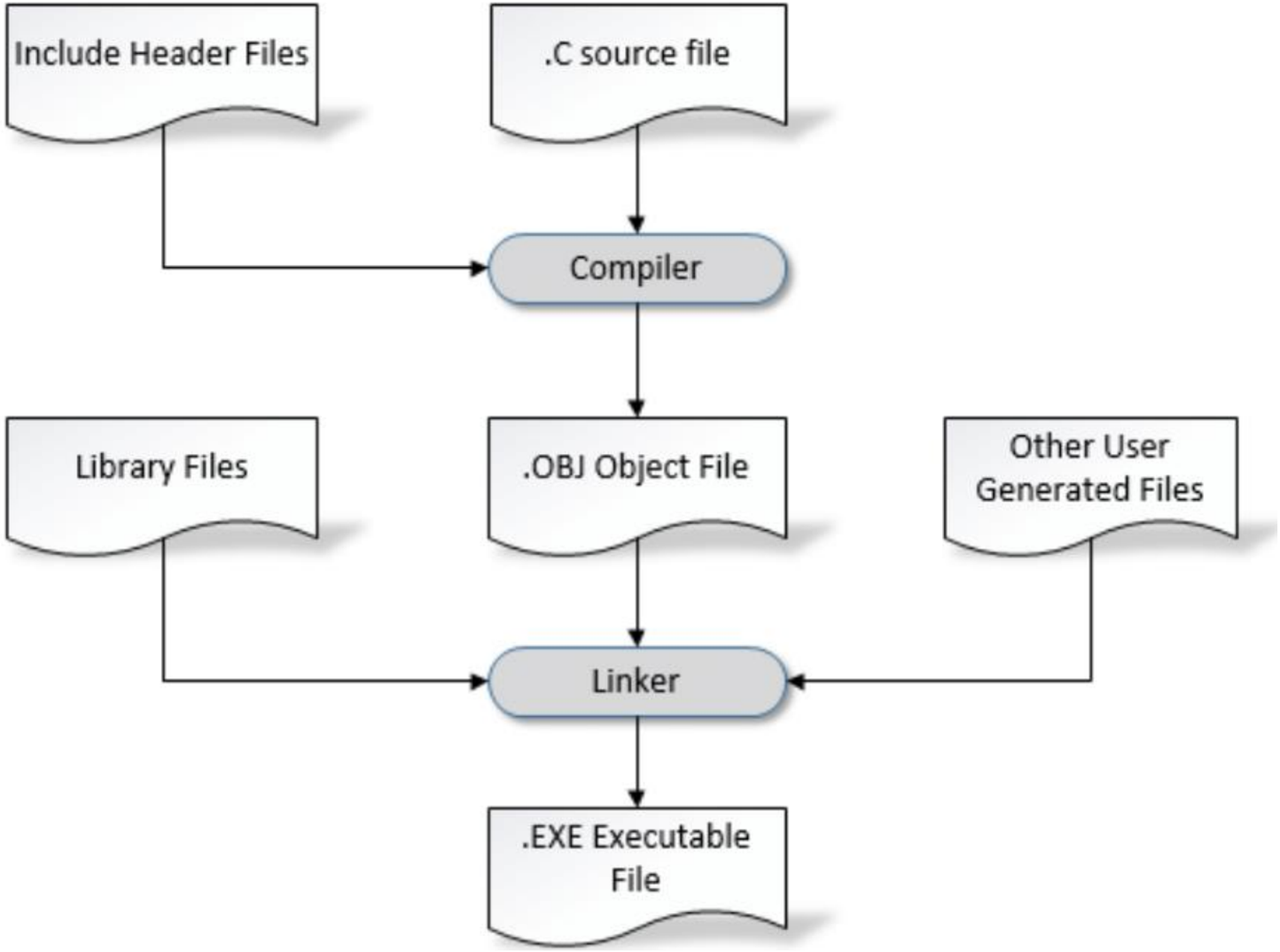
Compiler and Linker

- **Software Programs**
- **People Language Analogy**



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Compiler, Linker and Loader

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- **Software Programs**
- **People Language Analogy**
- **Machine (Binary) <=> Operating System (Object Codes) <=> C program (Humans)**
- **Compiler and Linker – Between OS and C Program**
- **Compilation Command**
  - **gcc filename.c**
    - **Creates a.out (Ubuntu) and a.exe (Windows)**
  - **gcc filename.c -o obj**
    - **Creates obj.out (Ubuntu) and obj.exe (Windows)**
- **Running**

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Compiler, Linker and Loader

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- **Compiler and Linker – Between OS and C Program**
- **Compilation Command**
  - **gcc filename.c**
    - **Creates a.out (Ubuntu) and a.exe (Windows)**
  - **gcc filename.c -o obj**
    - **Creates obj (Ubuntu) and obj.exe (Windows)**
- **Running**
  - **./a.out**
  - **./obj**

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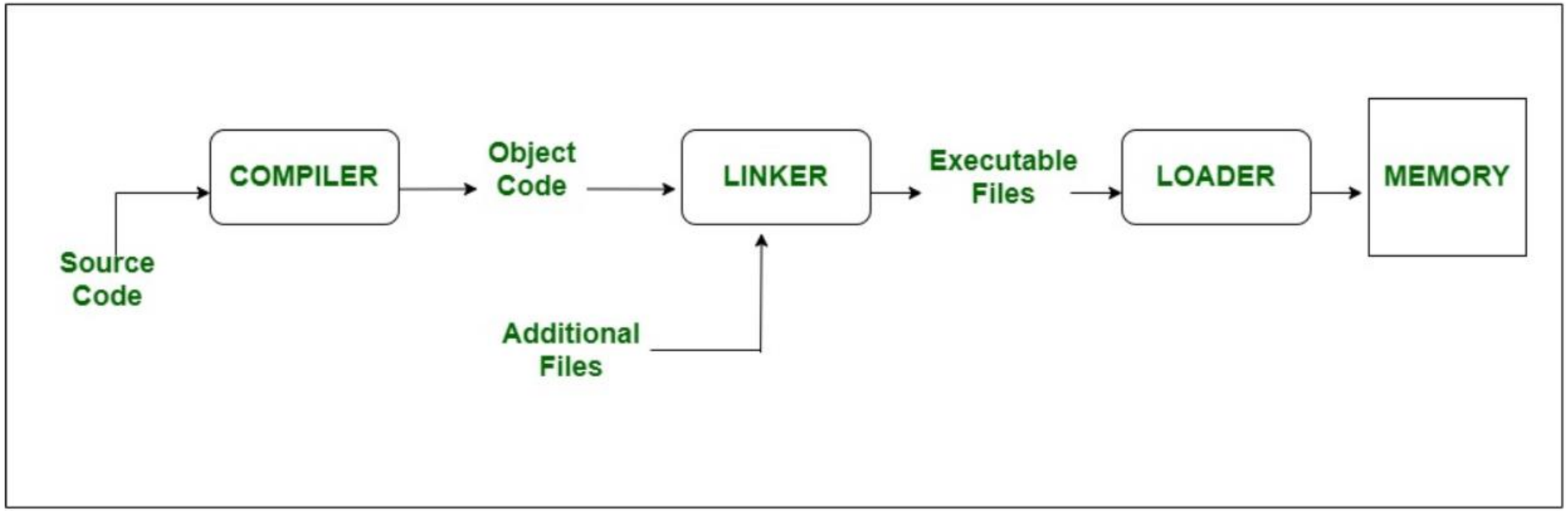
Compiler, Linker and Loader



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Today's Course Outcomes

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- **CO1 – Implement C programs from algorithms and flowcharts with error handling. – K3**
- **CO2 – Implement programming fundamentals, decision and looping statements – K3**
- **CO3 – Implement C programs with pointers, arrays, and strings – K3**
- **CO4 – Implement C programs with structures, union, file-handling concepts, and additional features – K3**
- **CO5 – Analyze, breakdown, and solve large computational problems using functions – K4**

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Summary

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- **Language**
- **Introduction to Number System**
- **Tokens**
- **Types of Tokens**
- **Visual Studio Code**
- **Compiler and Linker**
- **Compiler, Linker, and Loader**
- **Today's Course Outcome**

References

SHIV NADAR UNIVERSITY CHENNAI

- **Kernighan, B.W and Ritchie, D. M, “The C Programming language”, 2nd edition, Pearson Education, 2006**

THANK YOU

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