Introduction to Programming

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Learning Objectives [Lecture 5]

- ❏ Data Types
- ❏ Keywords in C
- ❏ Identifiers
- ❏ Variables

Basic Data types in C

Sl. No	Name	Description	Size in Byte	Format Specifier	Range
1	int	Integer	4	%d	-(2^31) to (2^31)-1
2	long int	Large integer	8	%ld	-(2^63) to (2^63)-1
3	char	Character	1	%c	-128 to 127 or -(2^7) to (2^7)-1
4	float	Single precision floating	4	%f	1.2E-38 to 3.4E+38
5	double	Double precision floating	8	%lf	1.7E-308 to 1.7E+308
6	long double	Extended double precision	12-16	%Lf	3.4E-4932 to 1.1E+4932

Single and Double Precision Format

Single Precision

Sign	Exponent	Fraction/Mantissa
S	EEEEEEEE	FFFFFFFFFFFFFFFFFFFFFFF
0	1 8	9 31

Example:

0	10000000	00000000000000000000000	= +1 * 2**(128-127) * 1.0 = 2
0	10000001	10100000000000000000000	= +1 * 2**(129-127) * 1.101 = 6.5
1	10000001	10100000000000000000000	= -1 * 2**(129-127) * 1.101 = -6.5

Double Precision

Sign	Exponent	Fraction
S	EEEEEEEE	FFFFFFFFFFFFFFFFFFFFFFF
0	1 11	12 63

C when compared to English language

Vocabulary = Keywords and operators.

Grammar = Syntax

Sentences = Statements

Paragraphs = Blocks

Essays = Programs

Keywords in C

- Reserved words having predefined meaning to the compiler.
- Cannot be used as variable / constant / function name.

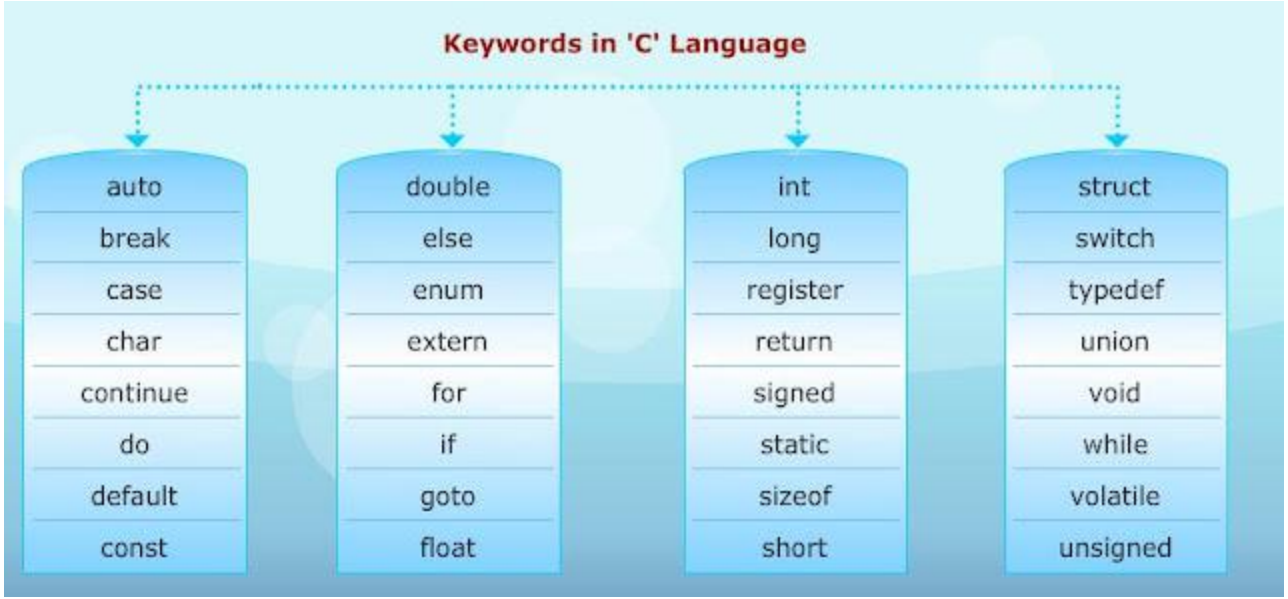


Image source: estudies

Identifier

- Valid name assigned to any entity such as variable, constant, function, etc.
- Sequence of letters (a-z or A-Z) and digits (0-9). '_' counts as a letter.
  - Ecs_102
  - _program
- White space is not allowed within an identifier.
  - Ecs 102 Wrong
- Any keyword cannot be an identifier.
- As C language is case sensitive, NAME and name are two different identifiers.

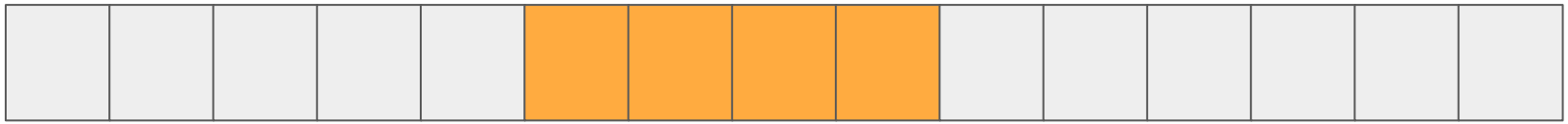
Variable

- Name of the memory location where some type of data can be stored.
- Suppose ECS is a variable

Variable Declaration / Definition

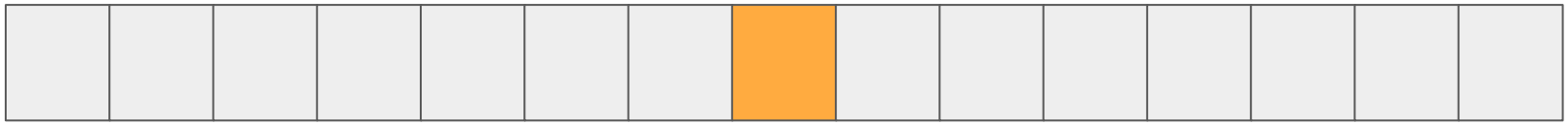
Syntax: data_type variable_name;

Example: int age; (4 Bytes)



age

char gender; (1 Byte)



gender

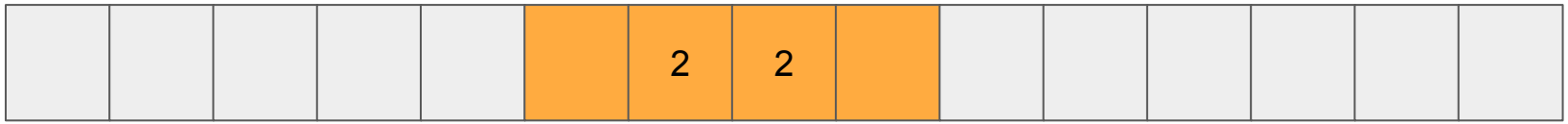
Suppose each cell has a capacity of 1 Byte or 8 Bits.

Variable Initialization

What happens when a variable is not initialized?

Syntax: data_type variable_name = value;

Example: int age=22; (4 Bytes)



age

char gender=”M”; (1 Byte)

gender

Suppose each cell has a capacity of 1 Byte or 8 Bits.

// Write a program to convert temperature in Celcius to fahrenheit.

```
#include<stdio.h>
void main()
{
        float cel = 37.0;
        float far;
        far = ((cel * 9)/5) + 32;

        printf("Given temperature in Celcius is %f\n", cel);
        printf("Converted into Farenheit is %f\n", far);
}
```

Output:
Given temperature in Celcius is 37.0
Converted into Farenheit is 98.599998

```
// Write a program to print name, age, gender, salary, and mobile number inputted by user.

#include<stdio.h>

void main(){

        // Declare variables

        char name[20];

        int age;

        char gender;

        float salary;

        long mobile_num;

        printf("Input Your Name, Age, Gender, Salary, and Mobile Number \n");

        // Take input from user

        scanf("%s %d %c %f %ld", name, &age, &gender, &salary, &mobile_num);

        // Print the user's Input

        printf("Your Details…\n")

        printf("%s, %d, %c, %f, %ld \n", name, age, gender, salary, mobile_num);

}
```

Output:

Input Your Name, Age, Gender, Salary, and Mobile Number
Akash, 37, M, 12345, 9898989898

Your Details…
Akash, 37, M, 12345, 9898989898