Introduction to C Programming

C is a general-purpose, high-level language that was originally developed by Dennis M. Ritchie in 1972 to develop the UNIX operating system at Bell Lab.

Why use C?

C was initially used for system development work like operating system. C was adopted as a system development language because it produces code that runs nearly as fast as the code written in assembly language. Some examples of the use of C might be −

- Operating Systems
- Language Compilers
- Assemblers
- Text Editors
- Print Spoolers
- Network Drivers
- Databases
- Language Interpreters

Structure Of *"C"* Programs

Before going and reading the structure of C programs we need to have a basic knowledge of the following:

- C's Character Set
- C's Keywords
- The General Structure of a 'C' Program
- How To End A Statement
- Array
- Loops (for, while, do-while)

C's Character Set

C does not use every character set and key found on
modern computers . The only characters that C - Language uses for its programs are as follows:

- ✓ A-Z all alphabets
- ✓ a-z all alphabets
- ✓ 0-9
- ✓ # % & ! _ {} [] () $$$$ &&&& |
- ✓ space . , : ; ' $ "
- ✓ + - / * =

Keywords

- "**Keywords**" are words that have special meaning to the **C** compiler.
- Their meaning cannot be changed at any instance.
- Serve as basic building blocks for program statements.
- All keywords are written in **only lowercase.**

Basic structure of "C" programs

```
#include <stdio.h>
  int main() {
            printf("Hello, World");
            return 0;
           }
```

Header Files

Entry Point Of Program

Statement is terminated by ;

Header Files

- The files that are specified in the include section is called as Header File.
- These are precompiled files that has some functions defined in them.
- We can call those functions in our program by supplying parameters.
- Header file is given an extension .h . (e.g., stdio.h, math.h)
- C Source file is given an extension .c .

Running a 'C' Program

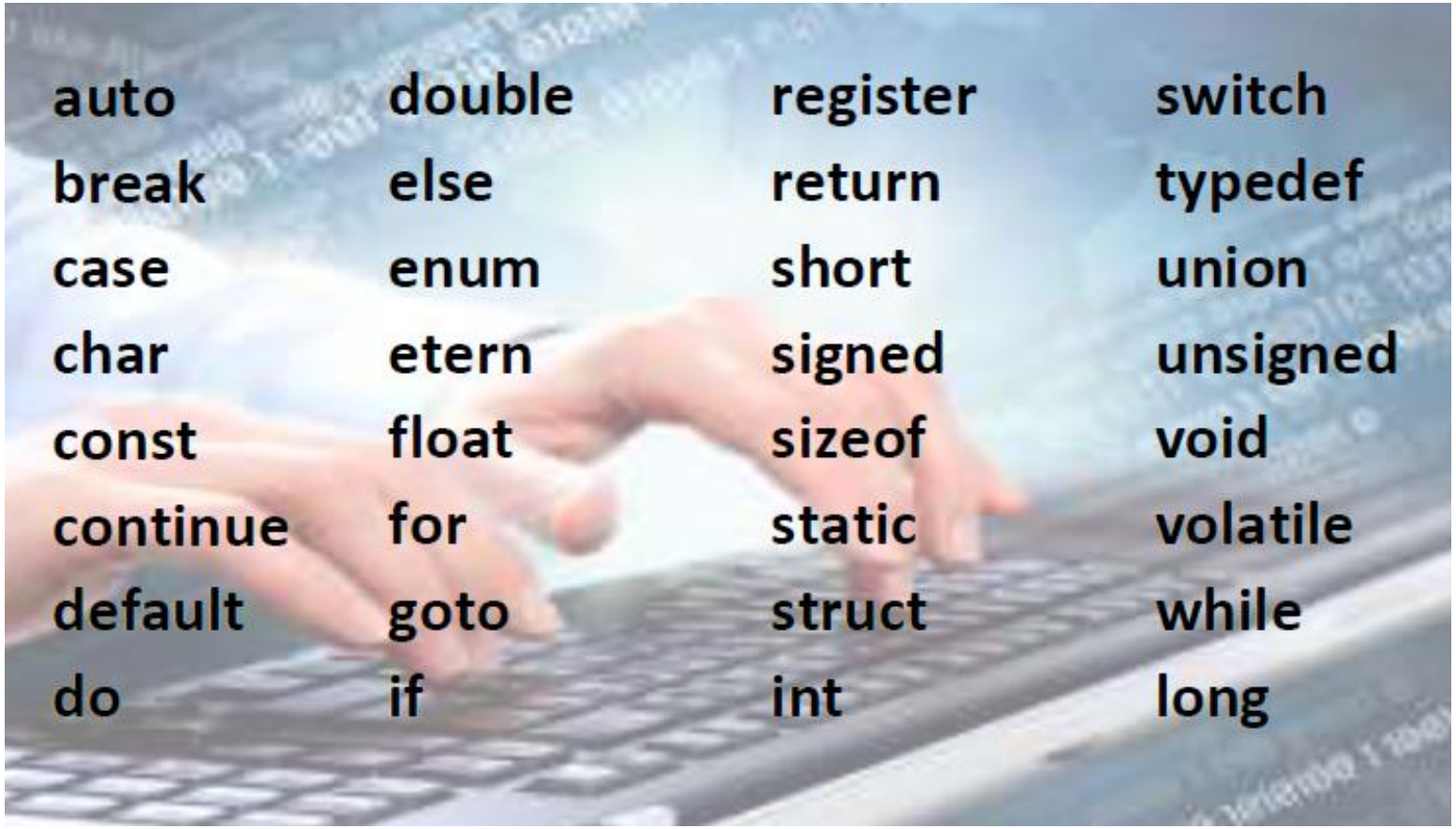
- gcc filename.c (for compilation through gcc compiler)
- ./a.out (for execution)

```
gcc –o abc filename.c
./abc
```

Other useful commands:

- gcc –v
- sudo apt-get update
- sudo apt-get install gcc (if it is not running, then sudo dpkg –configure –a; sudo apt-get –f install gcc)
- mkdir dirname
- cd dirname
- gedit filename.c

Keywords in C



Case Sensitivity

- ✓ C is a **case sensitive language.**
- ✓ It matters whether an **identifier**, such as a variable name, is uppercase or lowercase.
- ✓ Example:

area

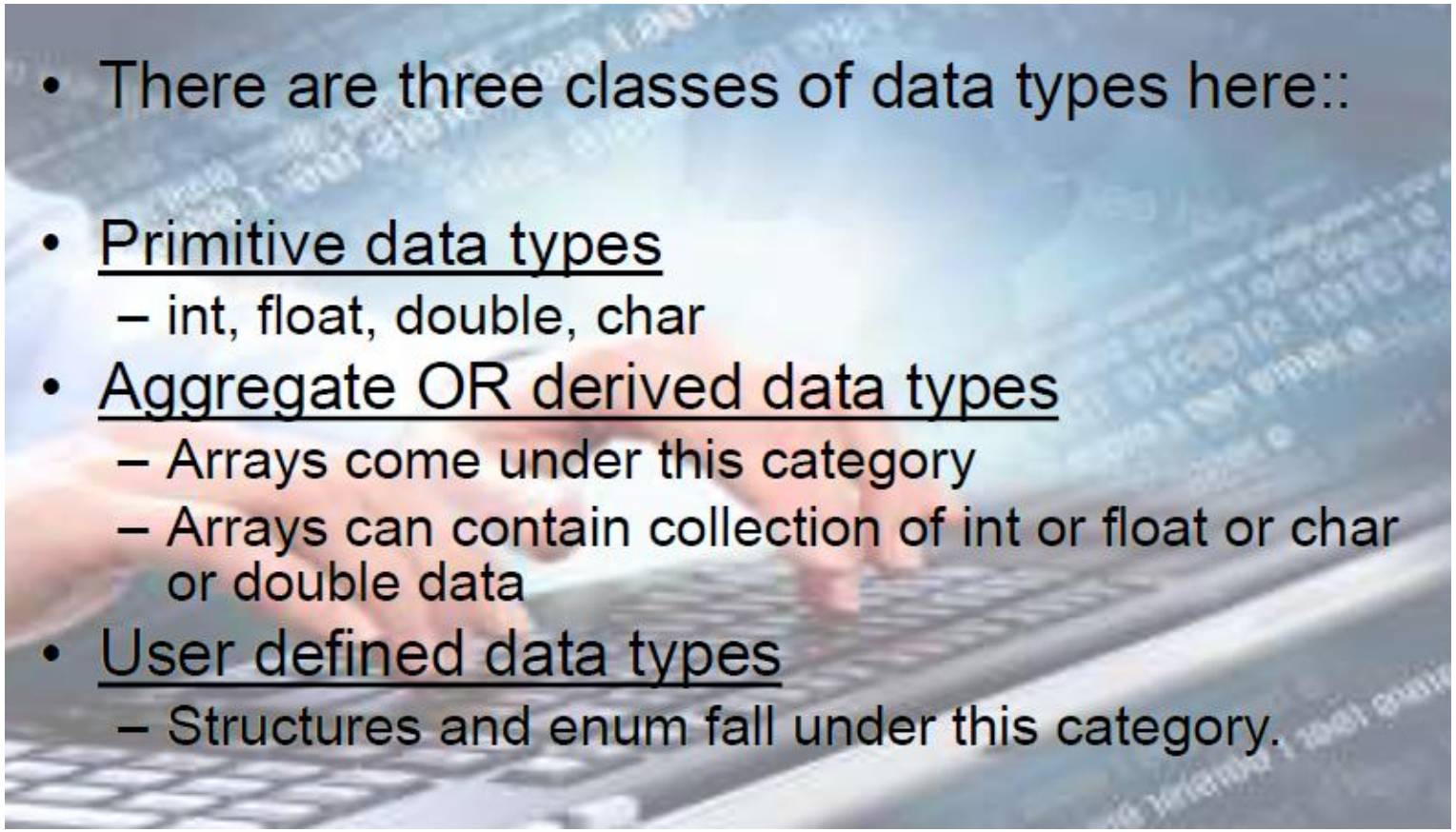
Area

AREA

ArEa

are all seen as <u>different</u> variables by the compiler.

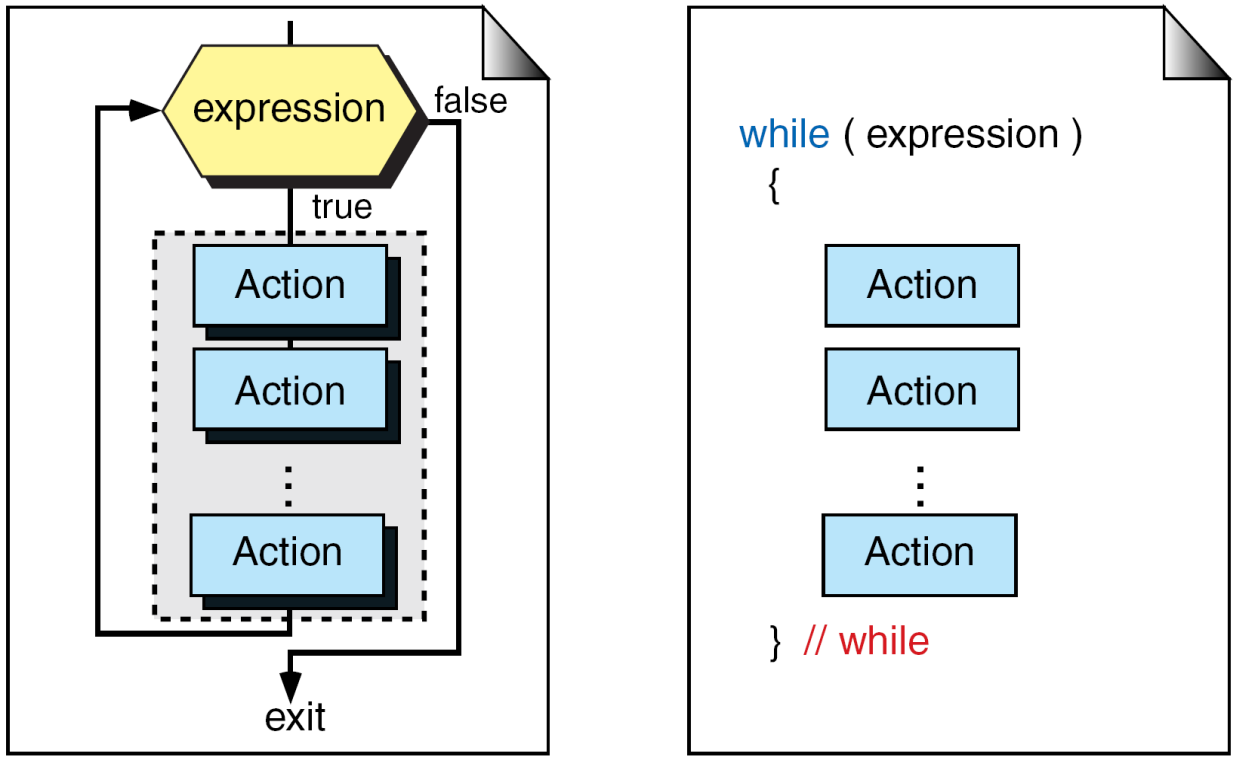
Data types


There are three classes of data types here::
Primitive data types
– int, float, double, char
Aggregate OR derived data types
– Arrays come under this category
– Arrays can contain collection of int or float or char or double data
User defined data types
– Structures and enum fall under this category.

Array declaration

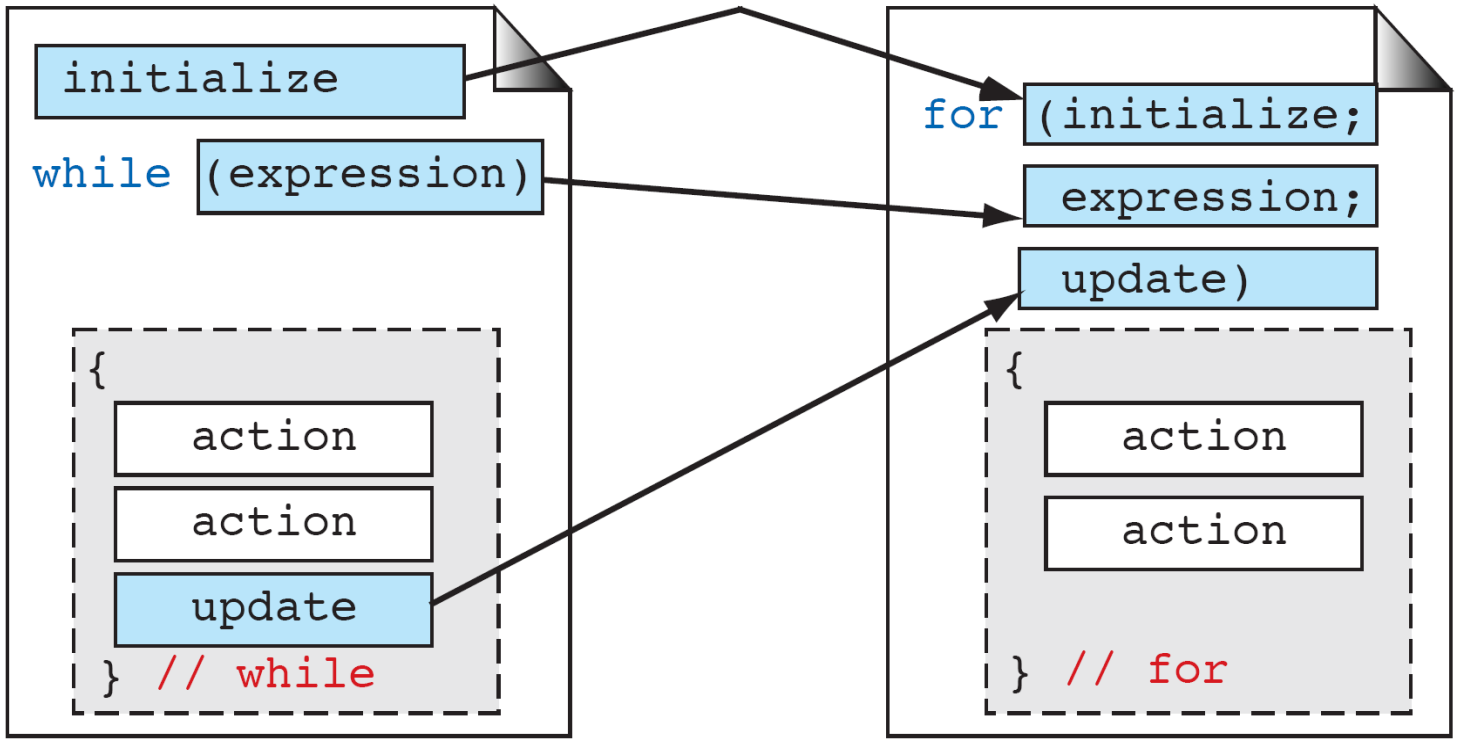
- int num[35]; /* An integer array of 35 elements */
- char ch[10]; /* An array of characters for 10 elements */
- Similarly an array can be of any data type such as double, float, short etc.

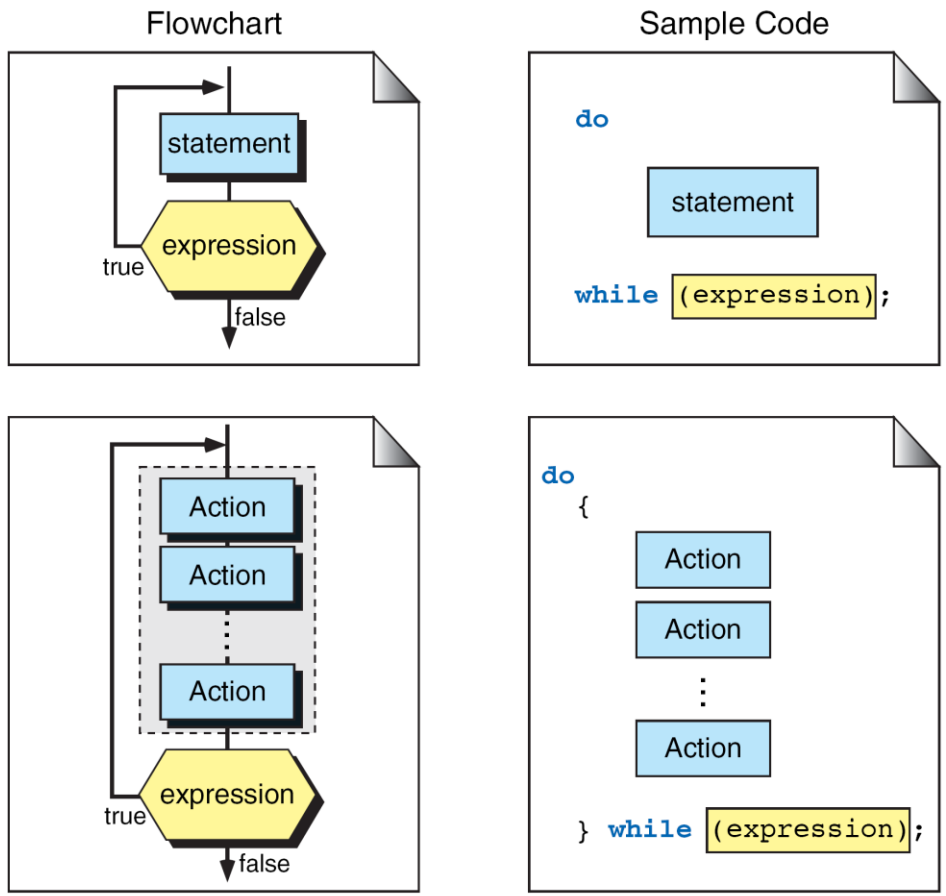
Loops:



(a) Flowchart

(b) C Language


initialize
while (expression)
{
action
action
update
} // while
for (initialize;
expression;
update)
{
action
action
} // for


Flowchart
Sample Code
statement
expression
true
false
do
statement
while (expression);
Action
Action
Action
expression
true
false
do
{
Action
Action
Action
} while (expression);

Pretest
nothing prints

```
while (false)
   {
    printf("Hello World");
   } // while
```

```
do
   {
    printf("Hello World");
   } while (false);
```

Post-test
Hello... prints

Reference

- *Let Us C*, Fifth Edition, Yashavant P. Kanetkar (https://www.computer-pdf.com/getfile)