CS - 114 : Computer Workshop

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Types of variable

- We must declare the type of every variable we use in C.
- Every variable has a type (e.g. int) and a name.
- This prevents some bugs caused by spelling errors (misspelling variable names).
- Declarations of types should always be together at the top of main or a function (see later).
- Other types are char, signed, unsigned, long, short and const.

Identifiers and Keywords

- Names given to various program elements (variables, constants, functions, etc.)
- May consist of letters, digits and the underscore (âĂŸ_âĂŹ) character, with no space between.
- First character must be a letter or underscore.
- An identifier can be arbitrary long.
  – Some C compilers recognize only the first few characters of the name (16 or 31).
- Case sensitive : ’area’, ’AREA’ and ’Area’ are all different.

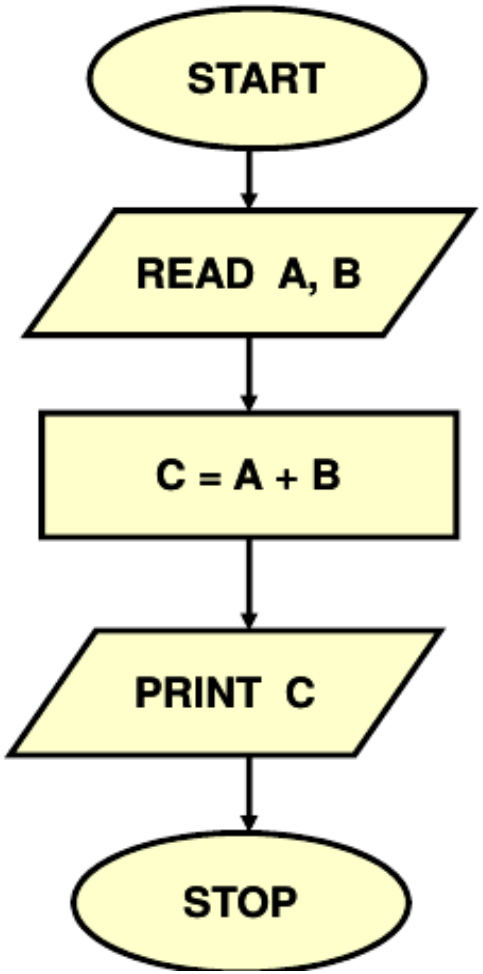
Valid identifiers

- X
- abc
- simple_interest
- a123
- LIST
- stud_name
- Empl_1
- Empl_2
- avg_empl_salary

Invalid identifiers

- 10abc
- my-name
- “hello“
- simple interest
- (area)
- %rate

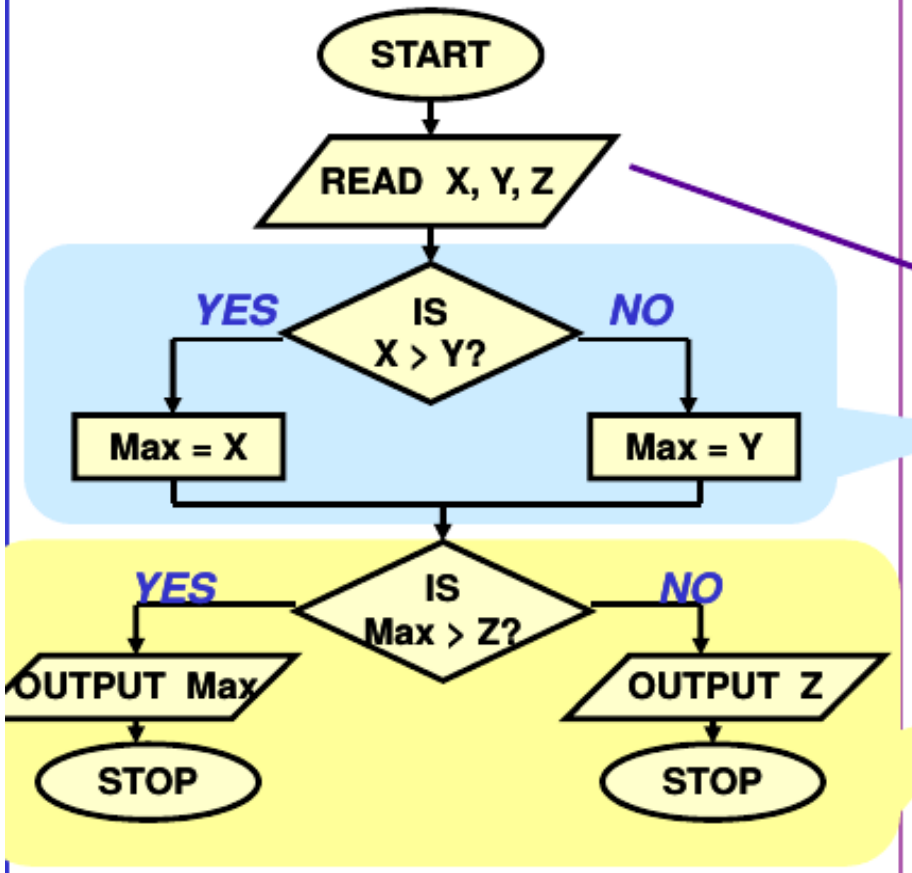
Another Example: Adding two numbers




```
#include <stdio.h>
main()
{
   int a, b, c;

   scanf("%d%d",&a,  &b);


   c = a + b;


   printf("%d",c);
}
```

Variable Declaration

Example: Largest of three numbers

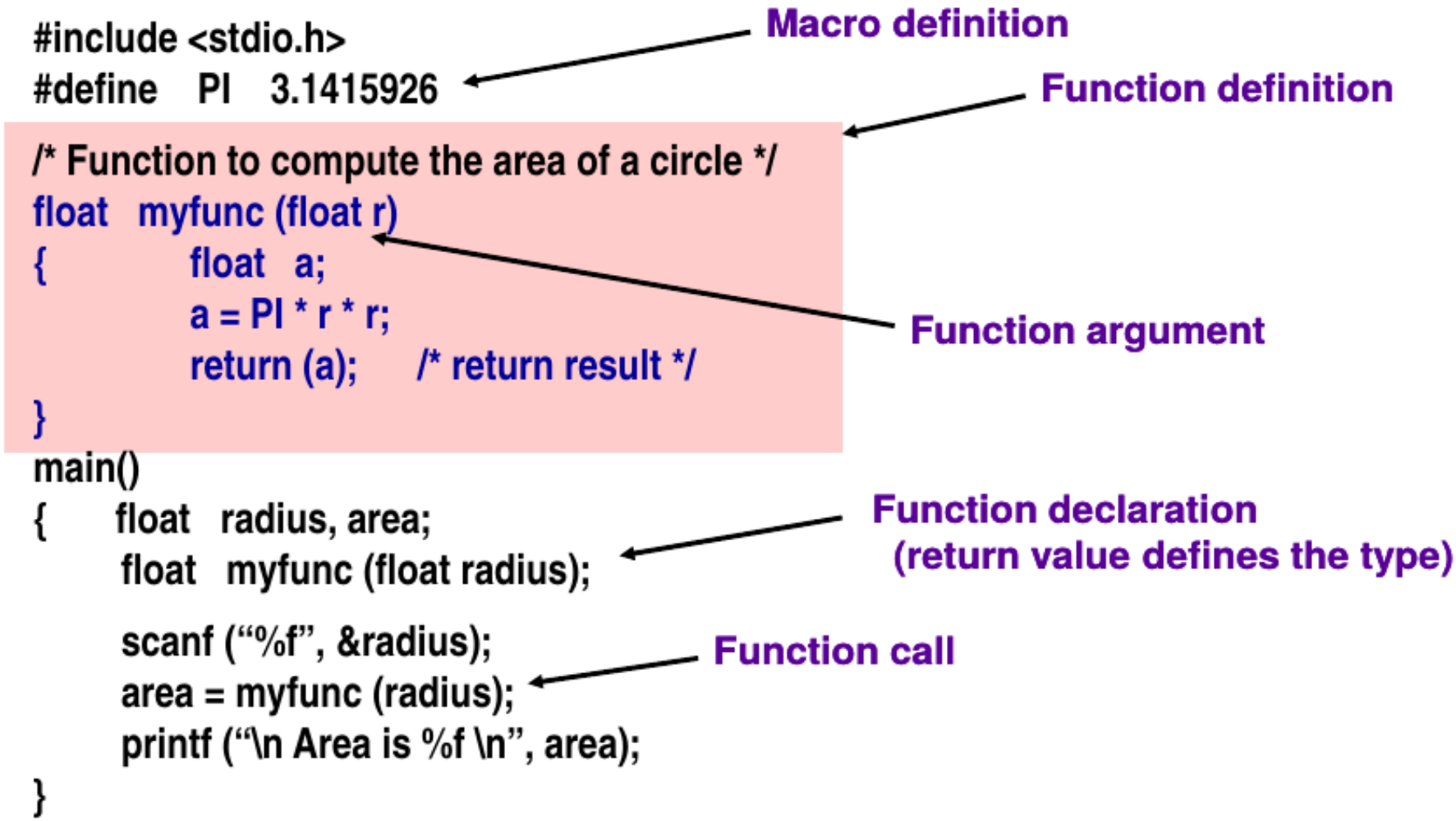



```
#include <stdio.h>
/* FIND THE LARGEST OF THREE NUMBERS */

main()
  {
     int   a, b, c, max;
     scanf ("%d %d %d", &x, &y, &z);

     if  (x>y)
           max = x;
     else max = y;

     if (max > z)
           printf("Largest is %d", max);
     else printf("Largest is %d", z);
}
```

Largest of three numbers: Another way

```
#include <stdio.h>

/* FIND THE LARGEST OF THREE NUMBERS */

main()
   {
      int   a, b, c;
      scanf ("%d %d %d", &a, &b, &c);
      if  ((a>b) && (a>c))    /* Composite condition check */
         printf ("\n Largest is %d", a);
      else
         if  (b>c)          /* Simple condition check */
            printf ("\n Largest is %d", b);
         else
            printf ("\n Largest is %d", c);
   }
```

Use of functions: Area of a circle



Structure of a C program

- Every C program consists of one or more functions.
  – One of the functions must be called main.
  –The program will always begin by executing the main function.
- Each function must contain:
  – A function heading, which consists of the function name, followed by an optional list of arguments enclosed in parentheses.
  – A list of argument declarations.
  – A compound statement, which comprises the remainder of the function.

Desirable Programming Style

- Clarity
  - The program should be clearly written.
  - It should be easy to follow the program logic.
- Meaningful variable names
  - Make variable/constant names meaningful to enhance program clarity.
    - 'area' instead of 'a'
    - 'radius' instead of 'r'
- Program documentation
  - Insert comments in the program to make it easy to understand.
  - Never use too many comments.
- Program indentation
  - Use proper indentation.
  - Structure of the program should be immediately visible.

Indentation Example: Good Style

```
#include <stdio.h>

/* FIND THE LARGEST OF THREE NUMBERS */

main()
{
        int   a, b, c;

        scanf("%d%d%d", &a, &b, &c);

        if  ((a>b) && (a>c))
                printf("\n Largest is %d", a);
        else
                if  (b>c)
                        printf("\n Largest is %d", b);
                else
                        printf("\n Largest is %d", c);
}
```

Indentation Example: Bad Style

```
#include <stdio.h>

/* FIND THE LARGEST OF THREE NUMBERS */
main()
{
int   a, b, c;
scanf("%d%d%d", &a, &b, &c);
if  ((a>b) && (a>c))
printf("\n Largest is %d", a);
    else
if  (b>c)
  printf("\n Largest is %d", b);
else
printf("\n Largest is %d", c);
}
```

Data Types in C

- int :: integer quantity
  Typically occupies 4 bytes (32 bits) in memory.
- char :: single character
  Typically occupies 1 bye (8 bits) in memory.
- float :: floating-point number (a number with a decimal point)
  Typically occupies 4 bytes (32 bits) in memory.
- double :: double-precision floating-point number

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- int :: integer quantity
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- double :: double-precision floating-point number
- Some of the basic data types can be augmented by using certain data type qualifiers :
  - short (bytes???)
  - long
  - signed and unsigned
- Typical examples:
  - short int
  - long int
  - unsigned int