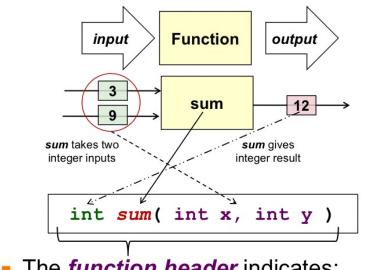
CS2100 - LO4 - Functions and Pointers Week 2+3 4.1 - Functions - Syntax and Semantics 4.2 - Pointers - Syntax and Semantics 4.3 - Function Parameter Passing - By Value - By Address / Pointer

4.1 - Functions

- Large programs should be modularized
 - Python, Java Script, C, etc.: function
 - Java, C++ : method
- Functions allow:
 - better maintenance
 - reusability



- The function header indicates:
 - Input (if any)
 - Data type of the output result (if any)

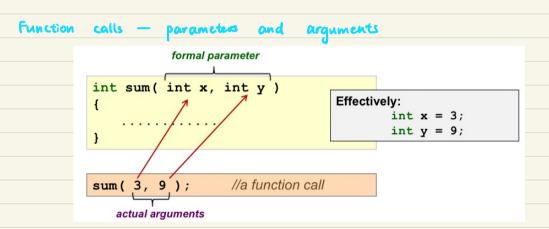
```
Syntax
```

```
function header

result_datatype function_name( [input parameters] )

{
    [0 or more declaration statements]
    [0 or more other statements]
    [return statement]
}

function body
```



- The result returned by a function:
 - is a single value
 - essentially replaces the function call and can be used in normal arithmetic operations and assignment

```
result = sum(3, 9) + sum(5, 2);

result = 12 + sum(5, 2);

result = 12 + 7;

result = 19;
```

Pointers - declaration

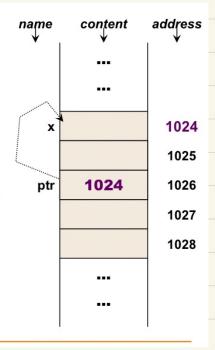
 A pointer variable stores the address of a memory location

int x;
int *ptr; ptr is an int pointer

ptr = &x; ptr points to x

- The "&" operator gives the address of a variable
 - known as address-of operator
- The ptr variable points to the variable x
 - Hence the name pointer

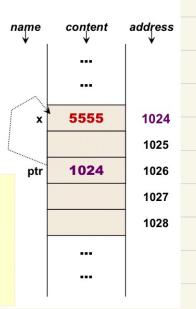




```
int *ptr, *ptr2; = int * ptrl, ptr 2;
```

Pointers - dereferencing

- We can follow the address stored in a pointer variable and manipulate the destination
 - Known as dereferencing
- A dereferenced pointer works like a normal variable of that type



notation :

- Declaration : declare pointer variable
- Usage: dereference pointer variable

By Value:

- Simple data types (int, float, char etc) and structures (covered later) are passed by value
- Cannot change the actual parameter

By Address:

- Requires the caller to pass in the address of variables using "&"
- Requires dereferencing of parameters in the function
- Arrays (covered later) are pass by address