한국외국어대학교
HANKUK UNIVERSITY OF FOREIGN STUDIES

Introduction to Computers & Lab

Lab 05

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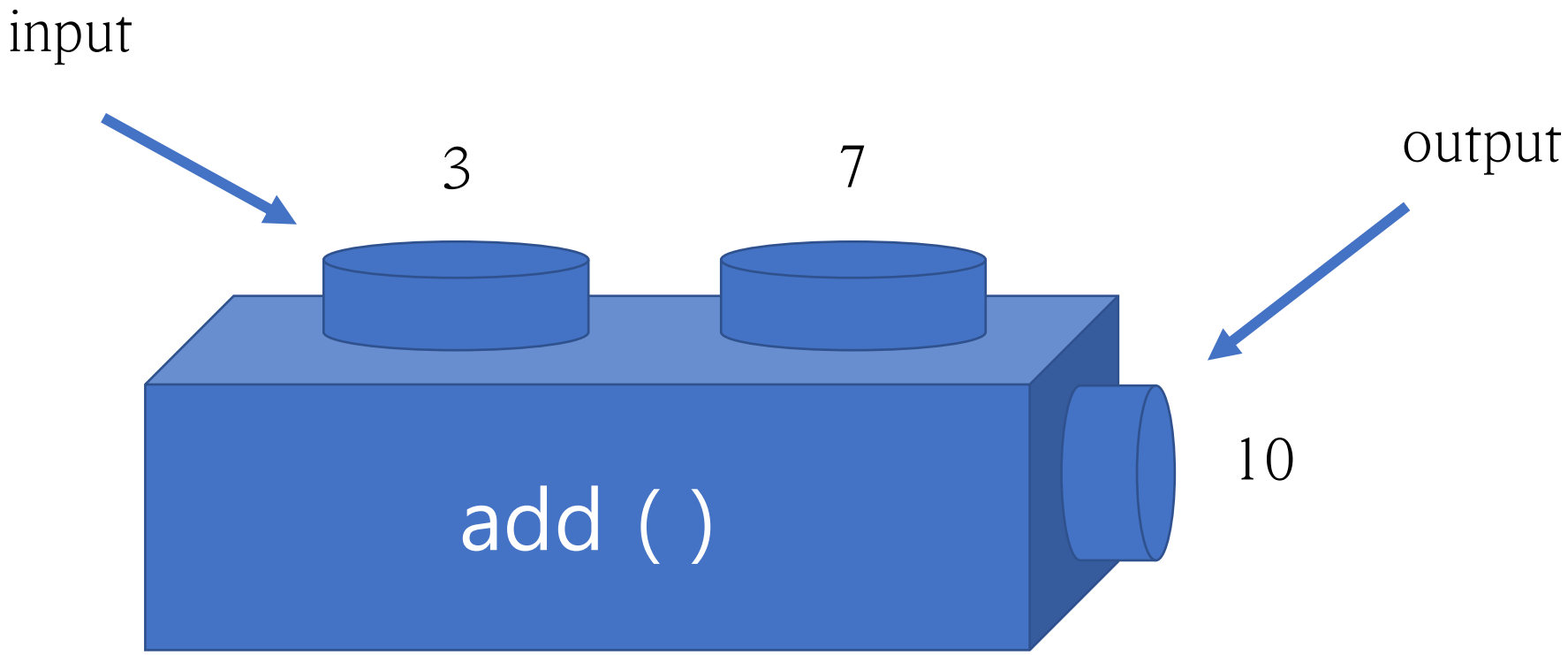
1. Review
    - what is functions?
    - call by value
    - header files

2. This week's Tasks + Hint

Simple function



function

```
**********
**********
**********
```

```c
#include <iostream>

int main() {

  int i;
  for(i=0; i<10; i++)
    printf("*");
  printf("\n");
  for(i=0; i<10; i++)
    printf("*");
  printf("\n");
  for(i=0; i<10; i++)
    printf("*");

  return 0;
}
```

```c
#include <iostream>

void print_star() {
  int i;
  for(i=0; i<10; i++)
    printf("*");
  printf("\n");
}

int main() {
  print_star();
  print_star();
  print_star();

  return 0;
}
```

=> It became much simpler to repeat the same sentence!

Advantages of a function

- The function prevents the code from duplicating.
- A once written function can be reused several times.
- The function allows the entire program to be divided into modules, making the development process easier and easier to maintain.

Called / Calling function


```
#include <iostream>

void print_star() {
   int i;
   for(i=0; i<10; i++)
      printf("*");
   printf("\n");
}

int main() {
   print_star();
   print_star();
   print_star();

   return 0;
}
```

Called function

Calling function

Data type of function

It depends on the value returned.

```
double raiseToPow ( double x , int power )
{
        double result ;
        int i ;
        result = 1.0 ;
        for ( i = 1 ; i <= power ; i ++ ) // braces first
        {
                result * = x ;    // result  = result  *x
        }
        return ( result ) ;
}
```

Call by value

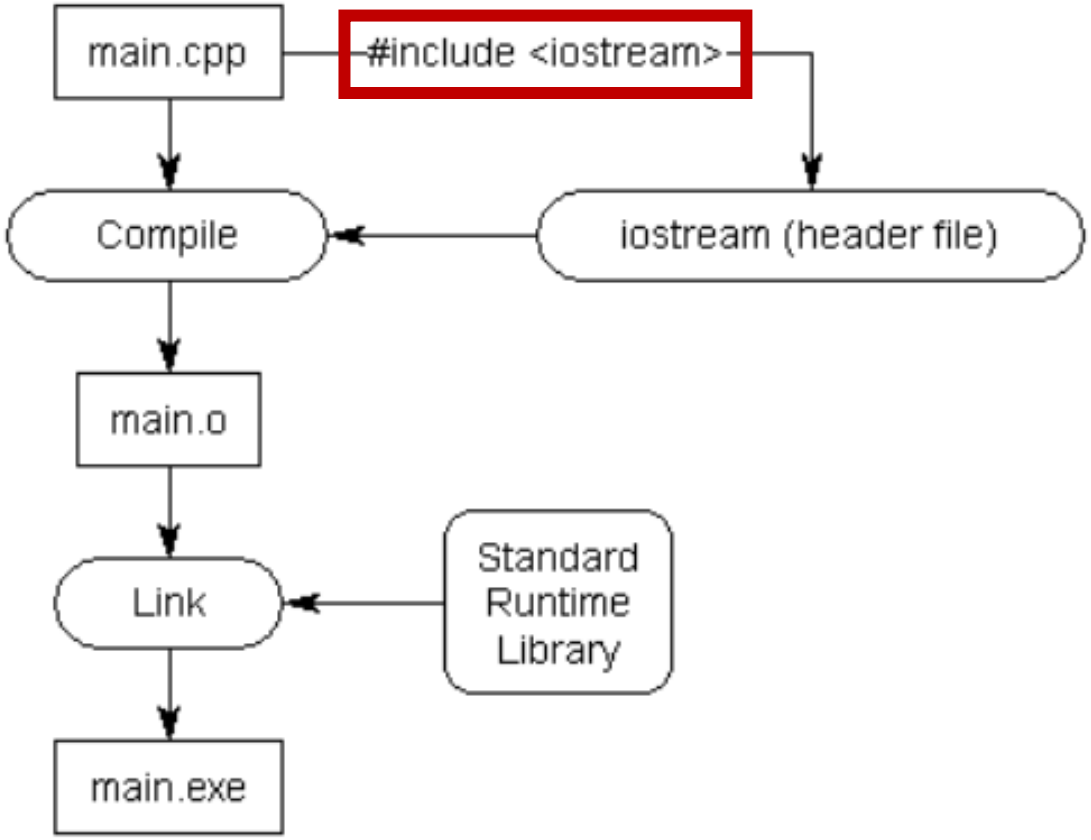
Copy the value that pass to the factor and send it to a new function.

```
#include <iostream>
using namespace std;

void swap(int a, int b);

int main() {
  int val1 = 10;
  int val2 = 20;
  swap(val1, val2);

  cout << "val1 : " << val1 << endl;
  cout << "val2 : " << val2 << endl;

  return 0;
}
```

```
void swap(int a, int b){
  int temp = a;
  a = b;
  b = temp;

  cout << "a : " << a << endl;
  cout << "b : " << b << endl;
}
```

```
a : 20
b : 10
val1 : 10
val2 : 20
```

Header file


main.cpp
#include <iostream>
Compile
iostream (header file)
main.o
Link
Standard
Runtime
Library
main.exe

Header file

Date.h

```
class Date
{
private:
  int m_Year;
  int m_Month;
  int m_Day;

public:
  Date(int year, int month, int day);

  void SetDate(int year, int month, int day);

  int GetYear() { return m_Year; }
  int GetMonth() { return m_Month; }
  int GetDat() { return m_Day; }
};
```

Date.cpp

```
#include "Date.h"

// Date 클래스의 생성자
Date::Date(int year, int month, int day)
{
   SetDate(year, month, day);
}

// Date 클래스의 멤버 함수
void Date::SetDate(int year, int month, int day)
{
   m_Month = month;
   m_Day = day;
   m_Year = year;
}
```

It is also possible to distinguish between declaration and implementation.

Task 1 : combination()

The combination of n to r can be obtained in the following manner:

$$_nC_r = \frac{n!}{(n-r)!r!}$$

★ Declare the following functions:

```
//Calculate combination values using factorial values
int combination(int n, int r);

double factorial(int n);
```

Task 2 : is_prime()

Write a code that determines whether the entered integer is prime or not.

★ Declare the following functions:

```
int is_prime(int);
```

★ Hint. Make sure that the rest is zero when you turn the repeating statement and divide it into numbers smaller than the integer.

Task 3 : Lotto

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Create a random number generation program. (1~99)
Print out 7 numbers.

★ Hint1. Use <random> library

★ In general, to generate random numbers in the [a,b] interval, use the following expression:

```
printf("%d", a+(rand()%(b-a+1)));
```

Task 4 : cmath

Write a code that looks for a trigonometric function.

$$n * \frac{\pi}{180}$$

```
double a = sin( x * 파이 / 180)
double b = cos( x * 파이 / 180)
double c = tan( x * 파이 / 180)
```

→ #define PI 3.141592