C Programming & Lab

7. Functions

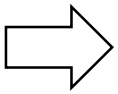
Sejong University

7-3) Practice 1

- **Read a positive integer N, print sum of the integers from 1 to N.**
  - ✓ add function
    - ✓ Arguments: two integers x and y, Return type: int type
    - ✓ Return sum of x and y
  - ✓ main function
    - ✓ Read an integer N, keep calling add function to compute the sum of integers
    - ✓ Cannot use addition (+) operator in main function. OK to use increment/decrement (++ or --)

Input Example 1

```
10
```



Output Example 1

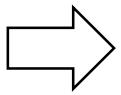
```
55
```

7-3) Practice 2

- **Read two positive integers A and B, compute the sum of numbers from A to B.**
  - ✓ Assume A≤B.
  - ✓ sum function
    - ✓ Argument: one integer n, Return type: int type
    - ✓ Return the sum of numbers from 1 to n, Use the equation n(n+1)/2

Input Example 1

```
4 8
```



Output Example 1

```
30
```

7-3) Practice 3

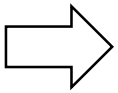
- **Read a positive integer X, print the result of the following equation.**

$$1 + (1+2) + (1+2+3) + (1+2+3+4) + \ldots + (1+2+\ldots+X)$$

- ✓ sum function
  - ✓ Argument: one integer n, Return type: int type
  - ✓ Return the sum of numbers from 1 to n, Use the equation n(n+1)/2

Input Example 1

```
4
```

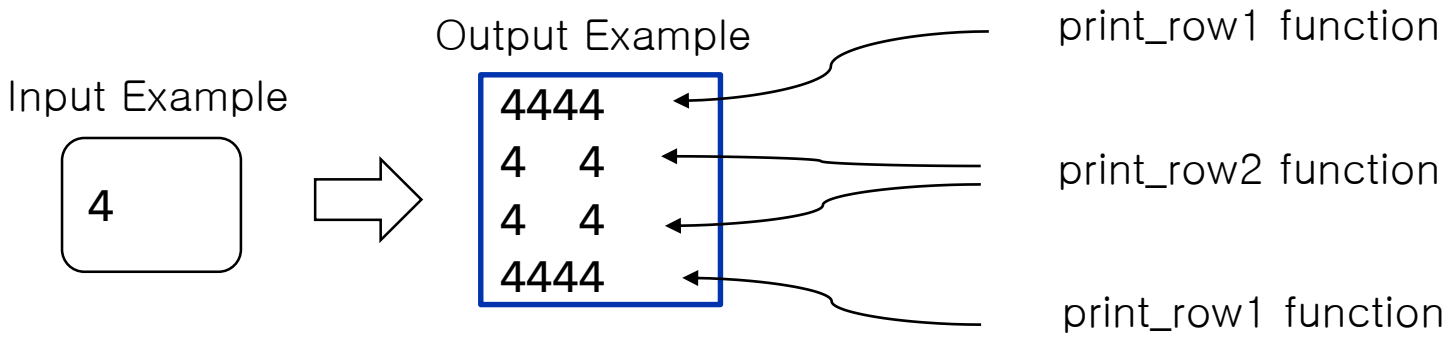


Output Example 1

```
20
```

7-3) Practice 4

- **Read an integer between 2 and 9, print a rectangle using the number N.**
  - ✓ print_row1 function
    - ✓ Argument: integer x between 2 and 9, Return type: void type
    - ✓ Print x x times in one line
  - ✓ print_row2 function
    - ✓ Argument: integer x between 2 and 9, Return type: void type
    - ✓ Print x twice and spaces in one line



7-3) Practice 5

- **Keep reading integers (until it terminates), print tree structures as shown below.**
  - ✓ Terminate: enter 0 or a negative number
  - ✓ print_triangle function
    - ✓ Argument: one integer x, Return type: void type
    - ✓ A triangle of height x

Input Example 1

```
3 -2
```

Output Example 1

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

Input Example 2

```
5 1 3 0
```

Output Example 2

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

7-3) Practice 6

- **Read an integer x, print the result of the following function.**

$$f(x) = 2x^2 - 5x + 1$$

- ✓ func function
  - ✓ Argument: one integer x, Return type: int type
  - ✓ Return the result of f(x)
- ✓ main function
  - ✓ Read an integer, call func(), print the result

Input Example1

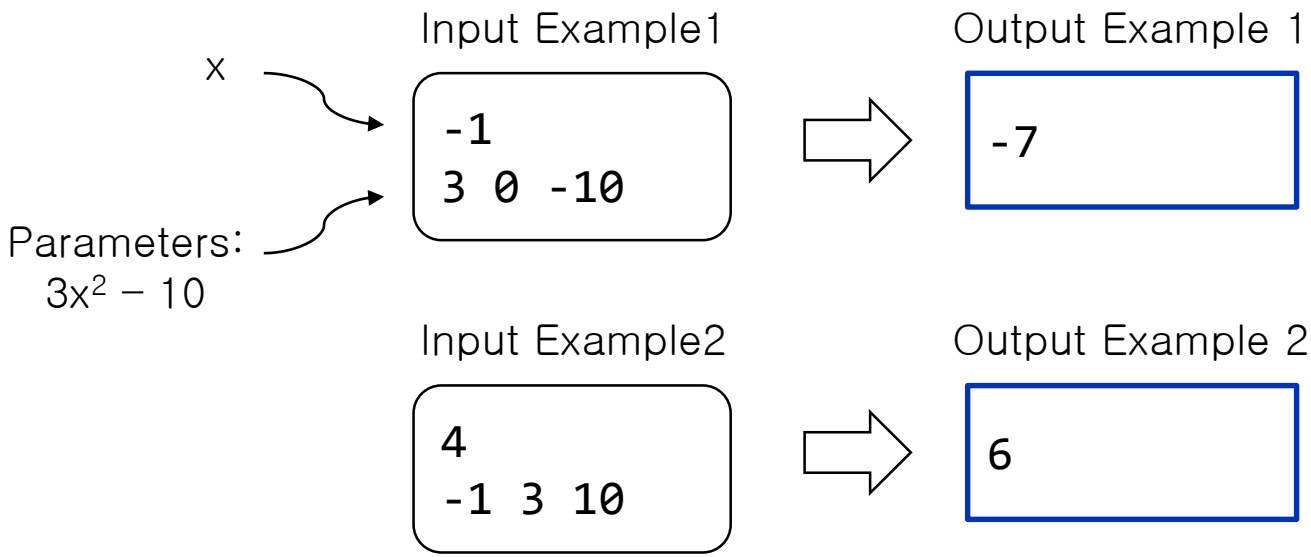
```
4
```

Output Example1

```
13
```

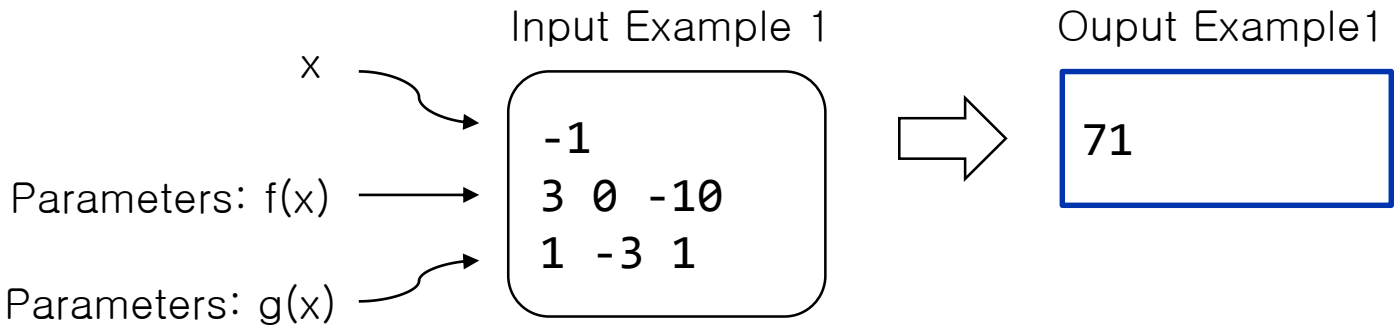
7-3) Practice 7

- **Read an integer x and 3 parameters of a 2nd order function f(x), print the result.**
  - ✓ func function
    - ✓ Argument: 4 integers x, a, b, c, Return type: int type
    - ✓ Result of $ax^2 + bx + c$
  - ✓ main function
    - ✓ Read integers, call func, print the result



7-3) Practice 8

- **Read an integer x and 6 parameters for two 2nd order functions f(x) and g(x), compute the result of g(f(x)).**
  - ✓ func function
    - ✓ Argument: 4 integers x, a, b, c, Return type: int type
    - ✓ Result of $ax^2 + bx + c$
  - ✓ main function
    - ✓ Read integers, call func, print the result

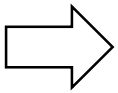


7-4) Practice 9

- **Keep reading integers (until it terminates), print the largest and second largest values.**
  - ✓ Terminate: enter 0 (Should enter two integers at least before terminating the program)
  - ✓ Use global variables max1, max2
  - ✓ update function
    - ✓ Argument: one integer x, Return type: void type
    - ✓ Assign the largest value to max1, the second largest value to max2

Input Example 1

```
22 -81 33 27 45 -23 0
```



Output Example 1

```
45 33
```

7-4) Practice 10

- **Suppose rolling three dices (each has numbers from 1 to 6)**
- **Read an integer N between 3 and 18, print all possible cases that the sum of 3 numbers (three dices) becomes equal to N.** **(Refer the next page)**
  - ✓ Use a global variable N: input
  - ✓ die1 function
    - ✓ Argument: one integer x, Return type: void type
    - ✓ Handle all the cases when the first dice shows x
    - ✓ Internally call dice2 function
  - ✓ die2 function
    - ✓ Argument: one integer x, Return type: void type
    - ✓ When the first dice shows x, the second dice shows y
    - ✓ Internally call dice3 function
  - ✓ die3 function
    - ✓ Argument: one integer x, Return type: void type
    - ✓ First, second, third dices show x, y, z, i.e., the sum of the numbers becomes N, then print x y z

7-4) Practice 10 (continue)

- ✓ main function
  - ✓ Read an integer, keep calling die1

Input Example 1

```
4
```

Output Example 1

```
1 1 2
1 2 1
2 1 1
```

Input Example 2

```
10
```

Output Example 2

```
1 3 6
1 4 5
1 5 4
1 6 3
2 2 6
2 3 5
2 4 4
2 5 3
2 6 2
3 1 6
…
```

omitted