
Programming Design In-class Practices

Functions

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Problem 1: the smaller number

- Given two integers, find the smaller one.
- Please write a function that:
 - Takes two integers a and b as parameters.
 - Returns one integer as the smaller one of a and b , i.e., $\min\{a, b\}$.
- You may use the following function prototype (header):

```
int min(int a, int b);
```

Problem 1: the smaller number

- Sample input/output:

Input:
10 18

Output:
10

Input:
18 9

Output:
9

Problem 2: greatest common divisor

- Given two integers, find their greatest common divisor (gcd).
- Please write a function that:
 - Takes two integers a and b as parameters.
 - Returns one integer as the greatest common divisor a and b .
- You may use the following function prototype (header):

```
int gcd(int a, int b);
```

- May you use the **min** function that you just implemented?

Problem 2: greatest common divisor

- Sample input/output:

Input:
10 18

Output:
2

Input:
18 9

Output:
9

Problem 3: gcd of three numbers

- Given three integers, find their greatest common divisor (gcd).
- Please write a function that:
 - Takes three integers a , b , and c as parameters.
 - Returns one integer as the greatest common divisor a , b , and c .
- You may use the following function prototype (header):

```
int gcd(int a, int b, int c);
```

- May you use the **gcd** function that you just implemented?

Problem 3: gcd of three numbers

- Sample input/output:

Input:
10 18 26

Output:
2

Input:
18 9 6

Output:
3

Problem 4: number of high grades

- Given n grades x_1, x_2, \dots, x_n of an assignment and a threshold t , find the number of grades that are no less than t .
 - $1 \leq n \leq 50, 0 \leq x_i \leq 100, 0 \leq t \leq 100$.
- Please write a function that:
 - Takes an integer n , an integer t , and an integer array x as parameters.
 - Returns the number of integers in x that are no less than t .
- You may use the following function prototype (header):

```
int highGradeCnt(int threshold, int gradeCnt, int grades[]);
```


Problem 4: number of high grades

- Input format:
 - The first line: an integer n , a white space, and an integer t .
 - The second line: n integers x_1, x_2, \dots , and x_n , separated by white spaces.
- Output format:
 - An integer as the number of x_i s that are no less than t .
- Sample input/output:

Input:

4 80

80 90 75 92

Output:

3

Input:

8 80

80 90 75 92 9 12 100 81

Output:

5

Problem 5: high grades of m assignments

- Given m assignments, each having n grades $x_{i,1}, x_{i,2}, \dots, x_{i,n}$, and a threshold t , find the assignment having the largest number of grades that are no less than t . If there are multiple, find the one with the smallest assignment ID.
 - $1 \leq m \leq 10, 1 \leq n \leq 50, 0 \leq x_i \leq 100, 0 \leq t \leq 100$.
- Please write a function that:
 - Takes an integer m , an integer n , an integer t , and an $m \times n$ integer array x as parameters. In x , row i means assignment i , and entry x_{ij} means the j th grade of assignment i .
 - Returns the assignment ID which has the largest number of no-less-than- t grades. When there is a tie, return the smallest ID.
- You may use the following function prototype (header):

```
int mostHighGrades(int threshold, int assignmentCnt, int gradeCnt, int grades[][50]);
```

Problem 5: high grades of m assignments

- Input format:
 - The first line: three integers m , n , and t , separated by white spaces.
 - The $i + 1$ line: n integers $x_{i,1}$, $x_{i,2}$, ..., and $x_{i,n}$, separated by white spaces.
- Output format:
 - An integer as an assignment ID.
- Sample input/output:

Input:

2 4 80

1 2 3 4

80 90 75 92

Output:

2

Input:

2 4 80

100 2 93 94

80 90 75 92

Output:

1