



國立臺灣大學

# Problem Set — Decision

Computer Programming (EE3031), F21

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# Prob. D01: Interval Intersection

In this problem, you are asked to implement a program that determines whether two intervals overlap or not.

An interval is denoted by two real numbers  $p$  and  $q$  ( $p \leq q$ ) which are the lower and upper bounds, respectively. For example,  $I = [-3, 2]$  denotes an interval bounded by -3 and 2. Note that a single point, i.e.,  $I = [p, p]$ , is a valid interval.

Two intervals overlap if they have non-empty intersection. The RHS table lists some examples.

$I_1$	$I_2$	intersection
[5, 10]	[7, 8]	[7, 8]
[1, 4]	[2, 10]	[2, 4]
[5, 20]	[3, 8]	[5, 8]
[5, 6]	[6, 10]	[6, 6]
[0, 5]	[6, 10]	$\emptyset$
[1, 3]	[5, 8]	$\emptyset$

- Your task is to write the program `overlap.py` which does the following.
  - Ask the user to enter two intervals.
    - For simplicity, the entered bounds are integers and the intervals are legal, i.e.,  $p \leq q$ .
  - Then, determines and prints out whether the two intervals overlap or not.

- Example IO:

```
ee3031 > python3 overlap.py
enter the lower bound of interval 1: 5
enter the upper bound of interval 1: 10
enter the lower bound of interval 2: 7
enter the upper bound of interval 2: 8
[5,10] and [7,8] overlap.
ee3031 > python3 overlap.py
enter the lower bound of interval 1: 0
enter the upper bound of interval 1: 5
enter the lower bound of interval 2: 6
enter the upper bound of interval 2: 10
[0,5] and [6,10] don't overlap.
ee3031 >
```

# Prob. D02: Quick Quiz 03

- Extend `quick_quiz_02.py` so that, if the problem is a subtraction problem, the answer must be non-negative.
- Name the program as `quick_quiz_03.py`.
- Example IO:

```
ee3031 > python3 quick_quiz_03.py
```

```
22 + 11 = 33
```

```
Good job!
```

```
ee3031 > python3 quick_quiz_03.py
```

```
44 + 69 = 30
```

```
44 + 69 = 113, not 30.
```

```
ee3031 > python3 quick_quiz_03.py
```

```
85 - 70 = 15
```

```
Good job!
```

```
ee3031 > python3 quick_quiz_03.py
```

```
80 - 46 = 26
```

```
80 - 46 = 34, not 26.
```

```
ee3031 >
```