

Com S 127x
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Classroom exercises

Problem 1: Assume we are keeping track of time with a 24-hour clock, that is, 00:00 is midnight, 12:00 is noon, 16:30 is 4:30 in the afternoon, and 23:59 is one minute before midnight.

a) If the current time is 00:00, what time will it be 200 minutes from now? What time will it be 2000 minutes from now?

b) If `elapsed` is any positive number, what time will it be `elapsed` minutes from midnight? Write the necessary Python statements.

Problem 2: An image is a rectangular grid of `width` x `height` pixels. We typically number the rows and columns starting at zero. The pixel values are stored in a file starting with row 0, then row 1, and so on. So each pixel has a *position* or index in the file, i.e., the first value is at position 0, the second value is position 1, and so on up to `width * height - 1`. Here is an example of an image with width 4 and height 3:

	0	1	2	3
0	a	b	c	d
1	e	f	g	h
2	i	j	k	l

The file would have the values listed like this:

0	1	2	3	4	5	6	7	8	9	10	11
a	b	c	d	e	f	g	h	i	j	k	l

a) Suppose the width is 5 and the height is 4. What is the position (in the file) of the pixel in row 2, column 1? What is the row and column of the pixel in position 13 of the file? *Draw a picture.*

b) Given values of two variables `width` and `height`, along with two variables `row` and `column` for a pixel within the image, determines its position in the file. Write the Python statements that would do this, assuming the variables are already defined.

Want more?

For the scenario of problem 1, if the current time is given by two variables `h` and `m`, determine what time it will be after `elapsed` minutes.

Find the one-millionth number in the sequence:

0, 1, 2, 3, 4, 5, 6, 0, 1, 2, 3, 4, 5, 6, 0, 1, 2, 3, ...