basic_exercises_pdf

January 29, 2019

1 An Introduction to Python

1.1 Basic Data Types and Operations

1.1.1 This notebook contains the programming exercises for An Introduction to Python: Basic Data Types and Operations.

1.1.2 This is the PDF version of the Jupyter Notebook, provided only for convenience. It is recommended that you download the Jupyter Notebook(.ipynb) and interactively code your answers.

2 Exercises

2.1 Do the following problems.

2.1.1 Jupyter Notebook Shortcuts:

There are two modes when a cell is highlighted.

Command Mode: Press ESC to activate. The cell has a blue border if this mode is active. In this mode, you can add, delete, create, copy and paste cells.

- create a new cell above the current cell: a
- create a new cell below the current cell: b
- delete the current cell: dd
- change the current cell's type to "Code": y
- change the current cell's type to "Markdown": m

Edit Mode: Press ENTER to activate. The cell has a green border if this mode is active. In this mode, you can edit and type text into the cell.

- execute the current cell and create a new cell: SHIFT + ENTER

Write code to compute the following. Remember to import the math library.

- 2^{16}
- $\frac{2-(3+4\cdot 7)}{5}$
- $(2-3i)+(4+i)$

- $(2+i)(4-3i)$
- $\sqrt{234}$
- 13//4
- -10 // 3
- sin(3π/5) (Use math.pi)

Compute the following boolean expression with code. x = 3 y = 10 z = -5

- $x \leq 1$ or $y = 10$
- $z > 0$ and $y > 0$
- not ($x \neq 3$ or $y >= -5$)

Mike's total on five tests is 384. What is the average of his tests?

```
In [103]: total = 384
```

Suppose that $a = 5, b = 2, c = 6$ are three sides of a triangle. The area of the triangle is given by

$$A = \sqrt{s(s-a)(s-b)(s-c)}$$

where $s = \frac{a+b+c}{2}$. Compute the area of this triangle. Your code should include all 5 variables.

Use the quadratic formula to solve $x^2 + 4x - 3 = 0$. The quadratic formula is

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}. \tag{1}$$

Your answers should be 0.6457513110645907 and -4.645751311064591.

```
In [1]: import math # use math.sqrt()
```

If today is Monday. Which day of the week is 4534 days from now? (Hint: Use %).

How many hours, minutes and seconds are in t=9452 seconds? Hint: First use // to find the number of hours then % to extract the remaining difference. Then repeat for minutes and seconds.

Create at least four other variables: `hours`, `minutes` and `seconds` and `remaining`.