

**Fundamentals of Programming**  
**Study Guide**  
**Competency Demo #2**

Like the first Competency Demo, this CD will be on Blackboard and will mostly feature true/false and multiple-choice questions with the possibility of a few short answer questions.

The Competency Demo is closed-notes, closed-book, etc.

You will take it on your time and on your honor between Thursday, October 17 and Tuesday, October 22.

1. Given the name for a variable, indicate whether it is a legal name in python (does it follow the rules of syntax).
  - Which of the following are valid variable names in Python?
    - i. home\_address
    - ii. Age
    - iii. return
    - iv. var1.3
    - v. 4square
    - vi. route66
  
2. Given one or more mathematical expressions using the python mathematical operators, indicate the result.
  - What is the resulting value of the following mathematical expressions when evaluated in Python?
    - i.  $(2 + 3 * 5) - 4 / 2$
    - ii.  $12 - 3 * 2 + 13 // 3$
    - iii.  $4 ** 3 - 1$
    - iv.  $4.0 / 10 + 2 * 3.5$
    - v.  $10 \% 4 + 7 / 2$
  
3. Describe the function of the three Python division operators.
  - What is the resulting value of the following mathematical expressions when evaluated in Python?
    - i.  $27 / 5$
    - ii.  $27 // 5$
    - iii.  $27 \% 5$

- Explain the *process* for what happens with each of the following operators.
  - /
  - //
  - %

4. Given one or more statements that set the value of a variable, indicate the data type of the variable.

- What is the resulting data type of the following mathematical expressions when evaluated in Python?

```
var1 = (2 + 3 * 5) - 4 / 2
var2 = 12 - 3 * 2 + 13 // 3
var3 = 4 ** 3 - 1
var4 = 4.0 / 10 + 2 * 3.5
var5 = 10 % 4 + 7 / 2
```

5. Given one or more statements, indicate the value(s) in one or more variables upon completion of the statements.

- What values are stored in x and y after the following code is executed?

```
x = 13
y = x
x = 7
```

6. Given a Boolean expression using one of the six Boolean operators (<, <=, >, >=, == or !=), indicate the evaluated output (True or False).

- What is the resulting value of each of the following Boolean expressions when evaluated in Python when x=7, y=9, and z=16?

```
x < y
x > y
x + y == z
z - y <= x
x >= z
y != z
```

7. Given a compound Boolean expression (one that includes one or more of AND, OR, or NOT, indicate the evaluated output (True or False).

- What is the resulting value of each of the following Boolean expressions when evaluated in Python when  $x=7$ ,  $y=9$ , and  $z=16$ ?

```
x < y and x > y
x + y == z or z - y <= x
not x >= z
```

8. Explain the difference in Python between = and ==.
9. Given a small script (including data with values) containing an if statement, indicate the output of the script.

What is printed by the following script?

```
x = 7
y = 13
print("TRUE")
if x + 4 < y:
    print("TRUE")
else:
    print("FALSE")
print("FALSE")
```