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CIRCLE COURSE SECTION: CIS-166 MW 1-3 CIS-166 MW 11-1
 CIS-166 MW 6-8 CMP-230 TTh 1-3
 CMP-230 TTh 9-11 CMP-230 MW 9-11
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Lehman College, CUNY
CIS-166 and CMP-230 Exam 1, Version 1, Fall 2013

1. What is the output of the following:

```
s = 3
t = 2 * s + 1
print(s, t)

u, v = t // 2, t % 2
w = t / 2
print(u, v, w)

s, t = t, s
s, t = s + t, s - t
print(s, t)
```

Output:

2. Write Python code that asks the user for the time of the day as hours (h) and minutes (m) in order to compute the total number of seconds (s) that have passed since the start of the day. For example, for $h = 18$, and $m = 10$, the output will be $s = 65,400$. Useful conversion formulas are: $1h = 60m$, and $1m = 60s$.

3. Write the following formulas in Python (You can assume that the `math` library has been imported):

(a) $6(x + 3)^2 - 9xy + 3y^w$

(c) $c = (\sqrt{a + b})^3$

(b) $\frac{\pi}{\sin(4\pi)}$

(d) $F = \ln\left(\frac{x-1}{y}\right)$

4. (a) What is the output of the following:

```
for count in range(4,9):  
    print(count//3, count != 6)
```

Output:

(b) What is the output of the following:

```
for index in range(2,11,2):  
    print(index*2, index/2)
```

Output:

5. What is the output of the following:

```
total = 0  
while total < 10:  
    total = total + 5  
    print( total )  
    total = total - 3  
print("Whew!")
```

Output:

6. Imagine you work for a company in which the following policy for salary raises apply:

- (a) Employees with a salary of \$50,000 or less, receive a yearly raise of 10%.
- (b) Employees making more than \$50,000 receive a 5% yearly raise.
- (c) Salaries of \$100,000 and beyond can only receive a 1% raise.

Write a Python program to help compute the new salary for any employee after receiving a yearly raise. In other words, for an input salary, the program will print out the new salary. For example,

```
>>>  
Enter the current salary: 20000  
The new salary is: 22000.0
```

7. Rewrite the following for loop, as an equivalent `while` loop.

```
for var in range (6,14,2):  
    print(var)
```

8. Write Python program that repeatedly asks the user to enter a number. It should continue to ask for numbers until it receives a number for which the cosine is greater than 0.5. If the cosine is less than or equal to 0.5, it should print "Try again" and ask for a new number. Once the number has been found, the code should print out how many tries it took.

9. Write Python program that helps a user compute the price a new car. Your program should ask the user for the color of the car, the model year of the car, and how many doors the car has. Your program should compute and print the price of the specified car. The pricing of a car follows these rules:
- (a) The base price of a car is \$5000.
 - (b) A special color adds \$2000 to the price (the special colors are pink and purple).
 - (c) A four-door adds \$100 to the price.
 - (d) A two-door subtracts \$500 from the price.
 - (e) If the model year is older than 2009, the price is reduced by 50%.

So a 1994 pink two-door would cost $(5000 + 2000 - 500)/2$.

10. Imagine that you are hired by a restaurant that wants to reward its customers based on the number of guests they bring and the total price of what they order for their table. You are asked to write a program to achieve the following:
- (a) Ask the user for the number of guests in the group.
 - (b) Ask the user for the total price of the orders for the table.
 - (c) If the number of guests is larger than 5 or the total is larger than or equal to \$200, then the bill is discounted by 5%. Otherwise the bill will remain unchanged.
 - (d) Print out the total payment to be paid by the group.

For instance, suppose 3 friends go to the restaurant and the total price of their orders is 215 which is larger than 200. Then this group will qualify for a discounted price equal to $215 - 0.05 \times 215 = 204.25$. Example:

```
>>>
```

```
Enter the number of guests in the group: 3
```

```
Enter the total price for the group: 215
```

```
The total amount to be paid by the group is 204.25
```

Some math library functions (from page 63 of the textbook)

Python	Mathematics	English
pi	π	An approximation of pi.
sqrt(x)	\sqrt{x}	The square root of x.
sin(x)	$\sin x$	The sine of x.
cos(x)	$\cos x$	The cosine of x.
tan(x)	$\tan x$	The tangent of x.
log(x)	$\ln(x)$	The natural (base e) logarithm of x.

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Lehman College, CUNY
CIS-166 and CMP-230 Exam 1, Version 2, Fall 2013

1. What is the output of the following:

```
s = 1
t = 3 * s + 3
print(s, t)

u, v = t // 3, t % 3
w = t / 3
print(u, v, w)

s, t = t, s
s, t = s + t, s - t
print(s, t)
```

Output:

2. Write Python code that asks the user for the day of the month (d) and the current hour (h) in order to compute the total number of minutes (m) that have passed since the start of the month. For example, for $d = 18$, and $h = 10$, the output will be $m = 26,520$. Useful conversion formulas are: $1d = 24h$, and $1h = 60m$.

3. Write the following formulas in Python (You can assume that the `math` library has been imported):

(a) $4a^6 + 7ab + b^a$

(c) $a = \sqrt{b^2 + c^2 - 2bc \cos(A)}$

(b) $\tan\left(\frac{\pi}{8} - k\right)$

(d) $T = 2\pi\sqrt{\frac{M}{k}}$

4. (a) What is the output of the following:

```
for count in range(3,8):  
    print(count//2, count == 6)
```

Output:

(b) What is the output of the following:

```
for index in range(3,16,3):  
    print(index*2, index/2)
```

Output:

5. What is the output of the following:

```
total = 0  
while total < 5:  
    total = total + 3  
    print( total )  
    total = total - 2  
print("Whew!")
```

Output:

6. Imagine you work for a company in which the following policy for salary raises apply:

- (a) Employees with a salary of less than \$50,000, receive a yearly raise of only 5%.
- (b) Employees making \$50,000 or more receive a 10% yearly raise.
- (c) Salaries of \$100,000 or more don't get raises.

Write a Python program to help compute the new salary for any employee after receiving a yearly raise. In other words, for an input salary, the program will print out the new salary. For example,

```
>>>  
Enter the current salary: 20000  
The new salary is: 22000.0
```


7. Rewrite the following for loop, as an equivalent `while` loop.

```
for var in range (6,18,3):  
    print(var)
```

8. Write Python code that repeatedly asks the user to enter a number. It should continue to ask for numbers until it receives a number for which the sine is greater than 0.5. If the sine is less than or equal to 0.5, it should print "Try again" and ask for a new number. Once the number has been found, the code should print out how many tries it took.

9. Write Python program that helps a user compute the price a new laptop. Your program should ask the user for the color of the laptop, whether it has a USB port, and if it is **Windows** or **Linux**. Your program should compute and print the price of the specified laptop. The pricing of a laptop follows these rules:

- (a) The base price of a laptop is \$1000.
- (b) A special color adds \$200 to the price (the special colors are blue and green).
- (c) A USB port adds \$100 to the price.
- (d) Not having a USB port subtracts \$150.
- (e) If it is a Windows machine, the price is reduced by 50%.

So a green Windows laptop without a USB port would cost $(1000 + 200 - 150)/2$.

10. Imagine that you are hired by a restaurant that wants to reward its customers based on the number of guests they bring and the total price of what they order for their table. You are asked to write a program to achieve the following:
- (a) Ask the user for the number of guests in the group.
 - (b) Ask the user for the total price of the orders for the table.
 - (c) If the number of guests is larger than 7 or the total is larger than or equal to \$150, then the bill is discounted by 4%. Otherwise the bill will remain unchanged.
 - (d) Print out the total payment to be paid by the group.

For instance, suppose 3 friends go to the restaurant and the total price of their orders is 170 which is larger than 150. Then this group will qualify for a discounted price equal to $170 - 0.04 \times 170 = 163.20$. Example:

```
>>>
```

```
Enter the number of guests in the group: 3
```

```
Enter the total price for the group: 170
```

```
The total amount to be paid by the group is 163.20
```

Some math library functions (from page 63 of the textbook)

Python	Mathematics	English
pi	π	An approximation of pi.
sqrt(x)	\sqrt{x}	The square root of x.
sin(x)	$\sin x$	The sine of x.
cos(x)	$\cos x$	The cosine of x.
tan(x)	$\tan x$	The tangent of x.
log(x)	$\ln(x)$	The natural (base e) logarithm of x.

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CIRCLE COURSE SECTION: CIS-166 MW 1-3 CIS-166 MW 11-1
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Lehman College, CUNY
CIS-166 and CMP-230 Exam 1, Version 3, Fall 2013

1. What is the output of the following:

```
s = 2
t = 5 * s - 1
print(s, t)

u, v = t // 5, t % 5
w = t / 5
print(u, v, w)

s, t = t, s
s, t = s + t, s - t
print(s, t)
```

Output:

2. Write Python code that asks the user for the day of the month (d) and the current hour (h) in order to compute the total number of seconds (s) that have passed since the start of the month. For example, for $d = 18$, and $h = 10$, the output will be $s = 1,591,200$. Useful conversion formulas are: $1d = 24h$, and $1h = 3600s$.

3. Write the following formulas in Python (You can assume that the `math` library has been imported):

(a) $(x - 1)^8 - y^x + 7xy$

(c) $b = (\sqrt{x - 1})^7$

(b) $\frac{\ln(x)}{6\pi}$

(d) $f = c \frac{\cos(3-x)}{(k-2)}$

4. (a) What is the output of the following:

```
for count in range(5,10):  
    print(count%2 , count == 9)
```

Output:

(b) What is the output of the following:

```
for index in range(5,26,5):  
    print(index*2, index/2)
```

Output:

5. What is the output of the following:

```
total = 0  
while total < 10:  
    total = total + 4  
    print( total )  
    total = total - 2  
print("Whew!")
```

Output:

6. Imagine you work for a company in which the following policy for salary raises apply:

- (a) Employees with a salary of \$20,000 or less, receive a yearly raise of 10%.
- (b) Employees making more than \$20,000, but less than \$40,000, can receive only a 5% yearly raise.
- (c) Any one else doesn't get any raises. In other words, their salary remains the same.

Write a Python program to help compute the new salary for any employee after receiving a yearly raise. In other words, for an input salary, the program will print out the new salary. For example,

```
>>>  
Enter the current salary: 15000  
The new salary is: 16500.0
```

7. Rewrite the following for loop, as an equivalent `while` loop.

```
for var in range (5,25,5):  
    print(var)
```

8. Write Python code that repeatedly asks the user to enter a number. It should continue to ask for numbers until it receives a number for which the tangent is greater than 0.5. If the tangent is less than or equal to 0.5, it should print "Try again" and ask for a new number. Once the number has been found, the code should print out how many tries it took.

9. Write Python program that helps a user compute the price a new sofa. Your program should ask the user for the pattern of the sofa, the year it was made, and how long it is in inches. Your program should compute and print the price of the specified sofa. The pricing of a sofa follows these rules:
- (a) The base price of a sofa is \$1500.
 - (b) A special pattern adds \$1000 to the price (the special patterns are zebra and clouds).
 - (c) A sofa over 78 inches long adds \$100 to the price.
 - (d) A sofa under 74 inches long subtracts \$500 from the price.
 - (e) If the sofa is made before 1900 it's an antique and the price is doubled.

So an 1887 zebra-patterned 73" sofa would cost $(1500 + 1000 - 500) \times 2$.

10. Imagine that you are hired by a restaurant that wants to reward its customers based on the number of guests they bring and the total price of what they order for their table. You are asked to write a program to achieve the following:
- (a) Ask the user for the number of guests in the group.
 - (b) Ask the user for the total price of the orders for the table.
 - (c) If the number of guests is larger than 6 or the total is larger than or equal to \$320, then the bill is discounted by 7%. Otherwise the bill will remain unchanged.
 - (d) Print out the total payment to be paid by the group.

For instance, suppose 4 friends go to the restaurant and the total price of their orders is 350 which is larger than 320. Then this group will qualify for a discounted price equal to $350 - 0.07 \times 350 = 325.50$. Example:

```
>>>
```

```
Enter the number of guests in the group: 4
```

```
Enter the total price for the group: 350
```

```
The total amount to be paid by the group is 325.50
```

Some math library functions (from page 63 of the textbook)

Python	Mathematics	English
pi	π	An approximation of pi.
sqrt(x)	\sqrt{x}	The square root of x.
sin(x)	$\sin x$	The sine of x.
cos(x)	$\cos x$	The cosine of x.
tan(x)	$\tan x$	The tangent of x.
log(x)	$\ln(x)$	The natural (base e) logarithm of x.

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Lehman College, CUNY
CIS-166 and CMP-230 Exam 1, Version 4, Fall 2013

1. What is the output of the following:

```
s = 3
t = 3 * s + 1
print(s, t)

u, v = t // 4, t % 4
w = t / 4
print(u, v, w)

s, t = t, s
s, t = s + t, s - t
print(s, t)
```

Output:

2. Write Python code that asks the user for the time of the day as hours (h) and minutes (m) in order to compute the fraction of the day (d) that has already passed since the beginning of the day. For example, for $h = 18$, and $m = 10$, the output will be $d = 0.757$. Useful conversion formulas are: $1h = \frac{1}{24}d$, and $1m = \frac{1}{60}h$.
Extra hint: $(18 + 10/60)/24 = 0.757$

3. Write the following formulas in Python (You can assume that the `math` library has been imported):

(a) $4y - 3^{(y+z)} + 7(z - 3)$

(c) $c = (\sqrt{2a})^9$

(b) $\frac{4k}{\cos(8\pi)}$

(d) $A = \frac{(r-3q)}{\ln n}$

4. (a) What is the output of the following:

```
for count in range(7,12):  
    print(count%3 , count == 10)
```

Output:

(b) What is the output of the following:

```
for index in range(7,24,4):  
    print(index*3, index/2)
```

Output:

5. What is the output of the following:

```
total = 0  
while total < 15:  
    total = total + 7  
    print( total )  
    total = total - 4  
print("Whew!")
```

Output:

6. Imagine you work for a company in which the following policy for salary raises apply:

- (a) Employees with a salary of less than \$20,000, receive a yearly raise of 10%.
- (b) Employees making \$20,000 or more, but less than \$40,000, can receive a 5% yearly raise.
- (c) Any one else gets only 1% raise.

Write a Python program to help compute the new salary for any employee after receiving a yearly raise. In other words, for an input salary, the program will print out the new salary. For example,

```
>>>  
Enter the current salary: 50000  
The new salary is: 50500.0
```

7. Rewrite the following for loop, as an equivalent `while` loop.

```
for var in range (2,26,6):  
    print(var)
```

8. Write Python code that repeatedly asks the user to enter a positive number. It should continue to ask for numbers until it receives a number for which the square root is greater than 5. If the square root is less than or equal to 5, it should print "Try again" and ask for a new number. Once the number has been found, the code should print out how many tries it took.

9. Write Python program that helps a user compute the price a new cell phone. Your program should ask the user for the weight of the phone in ounces, how much RAM it has, and if it is a smart phone or not. Your program should compute and print the price of the specified cell phone. The pricing of a cell phone follows these rules:

- (a) The base price of a sofa is \$50.
- (b) If the phone weighs over 4 ounces, reduce the price by \$25.
- (c) If the phone has more than 16 GB of RAM, and it's a smartphone add \$700 to the price.
- (d) If the phone has 16 GB of RAM or less, and it's a smartphone add \$500 to the price.

So a 5.5 oz. smartphone with 32 GB of RAM would cost $50 - 25 + 700$, but a 5.5 oz. dumb phone with 32 GB of RAM would cost $50 - 25$.

10. Imagine that you are hired by a restaurant that wants to reward its customers based on the number of guests they bring and the total price of what they order for their table. You are asked to write a program to achieve the following:
- (a) Ask the user for the number of guests in the group.
 - (b) Ask the user for the total price of the orders for the table.
 - (c) If the number of guests is larger than 8 or the total is larger than or equal to \$400, then the bill is discounted by 11%. Otherwise the bill will remain unchanged.
 - (d) Print out the total payment to be paid by the group.

For instance, suppose 6 friends go to the restaurant and the total price of their orders is 410 which is larger than 400. Then this group will qualify for a discounted price equal to $410 - 0.11 \times 410 = 364.90$. Example:

```
>>>
```

```
Enter the number of guests in the group: 6
```

```
Enter the total price for the group: 410
```

```
The total amount to be paid by the group is 364.90
```

Some math library functions (from page 63 of the textbook)

Python	Mathematics	English
pi	π	An approximation of pi.
sqrt(x)	\sqrt{x}	The square root of x.
sin(x)	$\sin x$	The sine of x.
cos(x)	$\cos x$	The cosine of x.
tan(x)	$\tan x$	The tangent of x.
log(x)	$\ln(x)$	The natural (base e) logarithm of x.