CSCI1200 Python Practice Exercises (Basics) Solutions

Expression

1. Consider the following code. What is the output?

```
a = 200
2*a+1
```

Answer: 401

2. Consider the following code. What is the output?

```
b = 4
4**0.5
```

Answer: 2.0

3. Consider the following code. What is the output?

```
4>14
```

Answer: False

4. Consider the following code. What is the output?

```
4<14
```

Answer: True

5. Consider the following code. What is the output?

```
a = 17
a%2
```

Answer: 1

6. Consider the following code. What is the output?

```
a = 14
a%2
```

Answer: 0

7. Consider the following code. What is the output?

```
a = 14
a%3
```

Answer: 2

8. Consider the following code. What is the output?

```
a = 14
a%12
```

Answer: 2

9. Consider the following code. What is the output?

```
True and False
```

Answer: False

10. Consider the following code. What is the output?

```
True or False
```

Answer: True

11. Which of the following values of `a` will the following expression be evaluated to `True`?

```
(a%3 == 0) and (a%5 == 0)
```

a. a = 3   > False
b. a = 5   > False
c. a = 15 > True
d. a = 25 > False

12. Which of the following values of `a` will the following expression be evaluated to `True`?

```
(a%3 == 0) and not (a%5 == 0)
```

a. a = 3   > True
b. a = 5   > False
c. a = 15 > False

d. a = 25 > False

13. Consider the following code. What is the output?

```
a, b, c = 1, 2, 4
x = 3
a*x**2 + b*x + c
```

Answer: 19

Function

1a. Consider the following function:

```
def test(x):
    return x%2 == 0
```

What is the value of:
1. `test(4)`   True
2. `test(7)`   False

1b. The function `test` above takes an input parameter `x` and returns `True` if `x` is even. Is this statement true or false?

Answer: True

2. Complete the following function `test` such that given an input parameter `x` which represents an integer, return `True` if `x` is odd; else return `False`.

```
def test(x):
    return x%2 == 1
```

3a. Consider the following function:

```
def test(x):
    return x%3 == 0
```

What is the value of:
1. `test(4)`   False
2. `test(7)`   False

3b. The function `test` above takes an input parameter `x` and returns `True` if `x` is a multiple of three. Is this statement true or false?

    Answer: True

4. Complete the following function `test` such that given an input parameter `x` which represents an integer, return `True` if `x` is a multiple of 5; else return `False`.

```
def test(x):

    return x%5 == 0
```

5. Consider the following function:

```
def test(x, y z):

    return x*y+z
```

What is the value of:
1. `test(4, 3, 2)`   14
2. `test(7, 1, 2)`   9

6. Complete the following function `test` that takes parameters `a`, `b`, and returns a^b.

```
def test(a,b):

    return a**b
```

7. Complete the following function `test` that takes parameters `a`, `b`, and returns a mod b.

```
def test(a, b):

    return a%b
```

8. Complete the following function `test` that takes parameters `a`, `b`, `c`, and `d`, and returns the average. (Sum of 4 parameters the divide by 4).

```
def test(a, b, c, d):

    return (a + b + c + d)/4
```

If

1. Consider the following function:

```python
def test(x):
    if x%3 == 0:
        print("Divisible by three")
    if x%5 == 0:
        print("Divisible by five")
```

What is the output?
1. `test(12)` "Divisible by three"
2. `test(25)` "Divisible by five"
3. `test(15)`

"Divisible by three"
"Divisible by five"

2. Consider the following function:

```python
def test(x):
    if x%3 == 0:
        print("Divisible by 3")
    else:
        print("Not divisible by 3")
    if x%5 == 0:
        print("Divisible by 5")
    else:
        print("Not divisible by 5")
```

What is the output?
1. `test(12)`

Divisible by 3
Not divisible by 5
2. `test(25)`

Not divisible by 3
Divisible by 5
3. `test(15)`

Divisible by 3
Divisible by 5

3. Consider the following function:

```python
def test(x):
    if x%3==0:
        print("Divisible by three")
    elif x%5==0:
        print("Divisible by five")
    else:
        print("Not divisible by five and three")
```

What is the output?

1. `test(12)`   Divisible by three
2. `test(25)`   Divisible by five
3. `test(15)`   Divisible by three

4. Consider the following function:

```python
def test(x):
    if x%15==0:
        print("Divisible by fifteen")
    elif x%3==0:
        print("Divisible by three but not by five")
    elif x%5:
        print("Divisby by five but not by three")
    else:
        print("Not divisible by five and three")
```

What is the output?

1. `test(12)`   Divisible by three but not by five
2. `test(25)`   Divisby by five but not by three
3. `test(15)`   Divisible by fifteen

5. Complete the following function `test` that takes an integer `n` and do the following:
- If `n` is divisible by 2, display "The number is even" otherwise,
- If `n` is divisible by 3, display "The number is divisible by three", otherwise,

- If n is divisible by 5, display "The number is divisible by five", otherwise,
- display "The smallest positive divisor of n is greater than five".

```python
def test(x):
  if (n%2 == 0):
    print("The number is even")
  elif (n%3 == 0)
    print("The number is divisible by three")
  elif (n%5 == 0)
    print("The number is divisible by five")
  else:
    print("The smallest positive divisor of x is greater than five")
```

6. Consider the following function:

```python
def test(n):
  if (n%2 == 0):
    return n//2
  else:
    return 2*n+1
```

What is the output?
1. `test(12)`   6
2. `test(25)`   51

7. Consider the following function:

```python
def test(n):
  if n<3:
    print("Less than three")
  elif n<6
    print("Between 3 & 5, inclusive")
  else:
    print("Greater or equal to 6")
```

What is the output?

1. `test(2)`   Less than three
2. `test(3)`   Between 3 & 5, inclusive
3. `test(4)`   Between 3 & 5, inclusive
4. `test(5)`   Between 3 & 5, inclusive
5. `test(6)`   Greater or equal to 6
6. `test(11)` Greater or equal to 6

8. Consider the following function. Complete the function with the appropriate numbers in ___.

```python
def test(n):
  if n<13:
    print("Less than 13")
  elif n<16:
    print("Between 13 & 15, inclusive")
  else:
    print("Greater or equal to 16")
```

9a. Consider the following function:

```python
def test(n):
  if n>=1 and n<=5:
    print("A")
  else
    print("B")
```

What is the output?
1. `test(3)`   A
2. `test(-1)` B
3. `test(6)`   B

9b. In order for the above function to print out appropriate properties of `n`. We should have "A" replaced by "Between 1 and 5, inclusive". Which of the following statement should "B" be replaced with? Choose the most appropriate statement.
a. "At least 6"
b. "Less than 1"
c. "Less than 1 and greater or equal to 6"

Answer: C. "Less than 1 and greater or equal to 6"

10. Complete the following function `test` that takes an integer `n` and do the following:
    - If `n` is between 1 and 10 (inclusive), return `n`, otherwise
    - Divide `n` by 2 and return the number

```
def test(n):
  if n>=1 and n<=10:
    return n
  else
    return n/2
```

11a. Consider the following function:

```
def test(n):
  if (n%2==0) and (n%3 == 0)
    print ("A")
  else:
    print ("B")
```

What is the output?
1. `test(3)`   B
2. `test(2)`   B
3. `test(6)`   A
4. `test(5)`   B

11b. In order for the above function to print out appropriate properties of n . We should have "A" be replaced by "Divisible by 2 and 3". Which of the following statement should "B" be replaced with? Choose the most appropriate statement.
a. "Odd"
b. "Not divisible by 3"
c. "Odd and not divisible by 3"
d. "Odd or not divisible by 3"

Answer: d

12. Complete the following function `test` that takes an integer `n` and do the following:
- If n is odd and is divisible by 5, return n. Otherwise, divide n by 2 and return the number.

```
def test(n):
  if (n%2 == 1) and (n%5 == 0):
    return n
  else:
    return n/2
```

13. Consider the following function:

```
def test(n):
  if n%3 == 0:
    if n%5 == 0:
      print("A")
    else
      print("B")
  else:
    if n%5 == 0:
      print("C")
    else:
      print("D")
```

What is the output?
1. `test(12)`   B
2. `test(25)`   C
3. `test(15)`   A
4. `test(37)`   D

14. Consider the following function:
In order for the function to print out the appropriate statement on the properties of `n`, each of the "A", "B", "C", "D" print statements should be replaced with one of the following:
Statement 1: "Divisible by 3 but not five"

Statement 2: "Divisible by 3 and five"
Statement 3: "Not divisible by three but divisible by five"
Statement 4: "Not divisible by three and five"

"A" should be replaced with statement 2.
"B" should be replaced with statement 1.
"C" should be replaced with statement 3.
"D" should be replaced with statement 4.

15. Complete the following function `test` that takes an input `x` and do the following:
    - If x is negative, return the negative of x^3, otherwise return x^3.

```
def test(x):
    if x < 0:
        return -x**3
    else:
        return x**3
```

String

1. Given a string `text = "text"`, what is the output of:
   a. `text[0]`   t
   b. `text[1]`   e
   c. `text[2]`   x
   d. `text[3]`   t
   e. `text[4]`   Index error: string index out of range
   f. `text[-1]`   t
   g. `len(text)`   4

2. Complete the following function `test` that takes a string `text` and an integer `i` as inputs and returns the value at `i` index of `text`.

```
def test(text, i):
    return text[i]
```

3a. Consider the following code:

```
def test(text):
    return text[0]==text[-1]
```

What is the output?

a. `test("hello")`   False
b. `test("lol")`   True
c. `test("a")`   True

3b. The function `test` above takes an input parameter `text` and returns `True` if the first element of `text` is equal to the last element of `text`. Is this statement true or false?

    Answer: True

4. Complete the following function `test` that takes a string `text` and returns `True` if the first element of `text` is the same as the second element of `text`. Assume that `text` has at least two characters.

```
def test(text):
    return text[0] == text[1]
```

5. Given a string `text = "text"`, what is the output of:

a. `text[:]`   text
b. `text[0:2]`   te
c. `text[1:2]`   e
d. `text[1:3]`   ex
e. `text[::2]`   tx
f. `text[:-1]`   tex
g. `text[1:-1]`   ex
h. `text[::-1]`   txet
i. "e" in text   True
j. "E" in text   False

6. Complete the following function `test` that takes a string `text` and returns a new string by removing the first and last character of `text`.

```
def test(text):
    return [1:-1]
```

7. Complete the following function `test` that takes a string `test` and returns a new string which is the reverse order of text.

```
def test(text):

   return text[::-1]
```

8. What is the output of

```
text = "text"

text + text
```

Answer: `texttext`

9. What is the output of

```
text = "text"

text * 3
```

Answer: `texttexttext`

10. What is the output of

```
text1 = 'text'

text2 = 'message'

text1 + text2
```

Answer: `textmessage`

11. Complete the following function `test` that takes two strings, `text1` and `text2`, and returns a new string which is the concatenation of the two input strings.

```
def test(text1, text2):

   return text1 + text2
```

12. Complete the following function `test` that takes two strings, `text1` and `text2`, and returns a new string which is the concatenation of the two input strings, separated by a space.

```
def test(text1, text2):

   return text1 + " " + text2

   # this method utilizes concatenation
```

```
def test(text1, text2):
    return f"{text1} {text2}"
    # this method utilizes f-strings
```

13. Complete the following function `test` that takes a string `text` and a positive integer `k` and returns a new string which is the repetition of `text` `k` times.

```
def test(text, k):
    return text*k
```

If and String

1. Consider the following code.

```
def test(text):
    if text[0]=="A":
        print("Starts with A")
    else:
        print("Not start with A")
```

What is the output:
(a) `test("Abc")`
(b) `test("abc")`
(c) `test("bcA")`

a) Starts with A
b) Not start with A
c) Not start with A

2. Complete the following function `test` which takes an input string `text` and
   • display "Ends with A" if `text` ends with "A" otherwise display "Not end with A".

```
def test(text):
    if _____:
        print("Ends with A")
    else:
```

```
        print("Not end with A")
```

```
text[-1]=="A"
```

3. Consider the following code.

```
def test(text):
  if text[0]=="A":
      print("Starts with A")
  elif text[0]=="B":
      print("Starts with B")
  else:
      print("Not start with A or B")
```

3. What is the output:
(a) `test("Abc")`
(b) `test("abc")`
(c) `test("bcA")`
(d) `test("BcA")`
(e) `test("ZcA")`

    a) Starts with A
    b) Not start with A or B
    c) Not start with A or B
    d) Starts with B
    e) Not start with A or B

4. Complete the following function `test` which takes an input string `text` and
  • display "Starts with A" if `text` starts with "A" , otherwise
  • display "Starts with B" if `text` starts with "B" , otherwise
  • display "Starts with C" if `text` starts with "C" , otherwise
  • display "Not start with A or B"

```
def test(text):
```

```
def test(text):
```

```
if text[0]=="A":
    print("Starts with A")
elif text[0]=="B":
    print("Starts with B")
elif text[0]=="C":
    print("Starts with C")
else:
    print("Not start with A or B")
```

5a. Consider the following code:

```
def test(text):
    if text[0]==text[-1]:
        return text[1:-1]
    else:
        return text
```

What is the output of
(a) `test("text")`
(b) `test("pest")`

a) `ex`
b) `pest`

5b. Which of the following describe the function `test` above:
(a) If the first element of `text` is the same as the last element of `text` return the new string by removing the first and last element of `text`.
(b) If the first element of `text` is the same as the last element of `text` return the new string by reversing the element in `text`.
(d) If the first element of `text` is the not the same as the last element of `text` return the new string by removing the first and last element of `text`.
(e) If the first element of `text` is the not the same as the last element of `text` rreturn the new string by reversing the element in `text`.

5b. a

6. Complete the following function `test` which takes an input string `text` and
   - if the first element of `text` is the same as the last element of `text`, return a new string by removing the last element of `text`, otherwise
   - return the string `text`

```
def test(text):
  if text[0]==text[-1]:
    return text[:-1]
  else:
    return text
```

7. Consider the following code:

```
def test(text,i):
  if i<len(text) and i>=0:
    return text[i]
  else:
    return "Invalid index"
```

8. What is the output of
(a) `test("text", 3)`
(b) `test("text", 5)`
(c) `test("text", -1)`

a) t
b) Invalid index
c) Invalid index

8. Complete the following function `test` which takes an input string `text` and a non-negative integer `i`.
   - If `i` is less than the length of `text`, return the value at the `i`-th index of `text`, otherwise
   - Change `i` to `i` modulo the length of `text` and return the value at the `i`-th index of `text`,

```
def test(text, i):
```

```
def test(text,i):
  if i<len(text):
    return text[i]
  else:
    i=i%len(text)
    return text[i]
```

Loops I

1. Consider the following code

```
def test(n):
  for i in range(n):
    print(i)
```

What is the output of `test(4)`?
0
1
2
3

2. Consider the following code

```
def test(n):
  for i in range(n):
    print(i+1)
```

What is the output of `test(4)`?
1
2
3
4

3. Consider the following code

```
def test(n):
    for i in range(n):
        print(2*i)
```

What is the output of `test(4)`?

0
2
4
6

4. Consider the following code

```
def test(n):
    for i in range(1,n):
        print(i)
```

What is the output of `test(4)`?

1
2
3

5. Consider the following code

```
def test(n):
    for i in range(1,n,2):
        print(i)
```

What is the output of `test(4)`?

1
3

6. Consider the following code

```
def test(n):
    for i in range(1,n,3):
        print(i)
```

What is the output of `test(4)`?

1

6. Consider the following code

```
def test(n):
    i=0
    while(i<n):
        print(i)
        i+=1
```

What is the output of `test(4)`?
0
1
2
3

7. Consider the following code

```
def test(n):
    i=1
    while(i<n):
        print(i)
        i+=1
```

What is the output of `test(4)`?
1
2
3

8. Consider the following code

```
def test(n):
    i=1
    while(i<n):
        print(i)
        i+=2
```

What is the output of `test(4)`?

1
3

9. Consider the following code

```
def test(n):
    i=1
    while(i<n):
        print(i)
        i+=3
```

What is the output of `test(4)`?

1

10. Consider the following code

```
def test(n):
    i=n
    while(i>=0):
        print(i)
        i-=1
```

What is the output of `test(4)`?

4
3
2
1
0

11. Consider the following code

```
def test(n):
```

```
    i=n
    while(i>=0):
        i-=1
        print(i)
```

What is the output of `test(4)`?

3

2

1

0

-1

12. Complete the following `test` function which takes two input integers `m` and `n` and print all integers from `m` to `n`, inclusive.

```
def test(m,n):
    for i in range(m,n+1):
        print(i)
```

Loops and If

1. Consider the following function

```
def test(n):
    for i in range(n):
        if(i%2==1):
            print(i)
```

What is the output of `test(4)`?

1

3

2. Consider the following function

```
def test(n):
```

```
   for i in range(n):
      if(i%2==1):
         print(i+1)
```
What is the output of `test(4)`?
2
4

3. Consider the following function

```
def test(n):
   for i in range(n):
      if(i%2==1):
         print(2*i)
```
What is the output of `test(4)`?
2
6

4. Consider the following function

```
def test(n):
   for i in range(n):
      if(i%2==1):
         print(2*i)
      else:
         print(i)
```
What is the output of `test(4)`?
0
2
2
6

Loops II (Accumulate)

1a. Consider the following function

```
def test(n):
    sum = 0
    for i in range(n):
        sum+=1
    return sum
```
What is the output of `test(4)`?
(1+1+1+1 which is 4)

1b. Consider the following function
```
def test(n):
    sum = 0
    for i in range(n):
        sum+=i
    return sum
```
What is the output of `test(4)`?
(0+1+2+3 which is 6)

1c. Given an integer number `n`, what is the value of `test(n)`? Choose the right answer.
(a) sum of all elements from 1 to `n`-1.
(b) sum of all elments from 1 to `n`.
a

2a. Consider the following function
```
def test(n):
    sum = 0
    for i in range(n):
        sum-=i
    return sum
```
What is the output of `test(4)`?
(0-1-2-3 which is -6)

2b. Given an integer number `n`, what is the value of `test(n)`? Choose the right answer.
(a) sum of all elements from 1 to `n`-1.
(b) sum of all elments from 1 to `n`.
(c) negative of sum of all elements from 1 to `n`-1.
(d) negative of sum of all elments from 1 to `n`.
c

3a. Consider the following function
```
def test(n):

    sum = 0

    for i in range(n):

        if(i%2==0):

            sum+=i

    return sum
```
What is the output of `test(5)`?
(0+2+4 which is 6)

3b. Given an integer number `n`, what is the value of `test(n)`? Choose the right answer.
(a) sum of all elements from 1 to `n`-1.
(b) sum of all elments from 1 to `n`.
(c) sum of all even elements from 1 to `n`-1.
(d) sum of all even elments from 1 to `n`.
(e) sum of all odd elements from 1 to `n`-1.
(f) sum of all odd elments from 1 to `n`.
c

4. Complete the following function `test` which takes an input integer `n` and returns the sum of all positive integers from 0 to `n`, inclusive.
```
def test(n):

    sum=0

    for i in range(n+1):
```

```
        sum+=i
    return sum
```

Loops and String/List

1. Consider the following code.

```
def test(text):
    for c in text:
        print(c)
```

What is the output of `test("hello")`?

h

e

l

l

o

2. Consider the following code.

```
def test(text):
    i=0
    while i<len(text):
        print(text[i])
        i+=1
```

What is the output of `test("hello")`?

h

e

l

l

o

3. Consider the following code.

```python
def test(text):
    i=len(text)-1
    while i>=0:
        print(text[i])
        i-=1
```

What is the output of `test("hello")`?

o

l

l

e

h

4. Consider the following code.

```python
def test(text):
    for c in text[::-1]:
        print(c)
```

What is the output of `test("hello")`?

o

l

l

e

h

5. Consider the following code.

```python
def test(text, key):
    for c in text:
        if key==c:
            return True
    return False
```

What is the output of
(a) `test("hello", "h")`
(b) `test("hello", "o")`
(c) `test("hello", "c")`
a) True
b) True
c) False

5. Consider the following code.

```python
def test(text, key):
    for c in text:
        if key==c:
            return True
        else:
            return False
```

What is the output of
(a) `test("hello", "h")`
(b) `test("hello", "o")`
(c) `test("hello", "c")`
a) True
b) False
c) False

6a. Consider the following code.

```python
def test(text, key):
    counter = 0
    for c in text:
        if key==c:
            counter+=1
    return counter
```

What is the output of
(a) `test("hello", "h")`
(b) `test("hello", "o")`

(c) `test("hello", "l")`
a) 1
b)1
c)2

6b. Which of the following about the `test` function above is true. There could be more than one true statements.
(a) For any valid inputs, the output is always non-negative.
(b) If `key` is in `text`, the output is always positive.
(c) if `key` is not in `text`, the output is zero.
(d) The output is the number of times `key` is in `text`.
all

7a. Consider the following code.

```
def test(text):
    for i in range(len(text)):
        if text[i]!=text[len(text)-i-1]:
            return False
    return True
```

What is the output of
(a) `test("abc")`
(b) `test("aba")`
(c) `test("a")`
(d) `test("abca")`
a) False
b) True
c) True
d) False

7b. The function `test` above return True if (select all that applies)
(a) `text` is a palindrome (reads the same backward as forward).
(b) `len(text)` is 1.
(c) the first element of `text` is the same as the last element of `text`.
(d) the first element of `text` is not the same as the last element of `text`.
a & b

8a. Consider the following code.

```
def test(text):
    for i in range(1,len(text)):
        if text[i]!=text[i-1]:
            return False
    return True
```

What is the output of
(a) `test("aa")`
(b) `test("aba")`
(c) `test("a")`
a) True
b) False
c) True

8b. The function `test` above return True if (select all that applies)
(a) `text` is a palindrome (reads the same backward as forward).
(b) `len(text)` is 1.
(c) the first element of `text` is the same as the last element of `text`.
(d) the first element of `text` is not the same as the last element of `text`.
(e) `len(text)` is 0.
(f) `text` is formed by a repetition of the same value.
b & e &f