# CMPT 120 Standard Final Exam

# Sample 1 Multiple Choice Questions

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| **Duration** | 1 hour |
| **Aids allowed** | No notes, no papers, no books, no computers, no calculators, etc. |
| **Scoring** | For each question fill in **the one best answer** on the answer sheet. Correct answers are worth 1 point. Incorrect answers, multiple answers, illegible answers, or unanswered questions are worth 0 points. |
| **During the exam** | Raise your hand if you have a question and remain seated. We will come to you. Questions about exam/course content will **not** be answered during the exam. |

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| 1) | What does this print?  print('3' + '4' \* 2) |
|  | A. 11 |
|  | B. 14 |
|  | C. 344 |
|  | D. 3434 |
|  | E. nothing is printed: the statement has an error |

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| 2) | Consider this code fragment:  a = 2.5 b = 3.2 a = b + a b = a + b  print(a) print(b)  i) The printed value of a is 5.7 ii) The printed value of b is 8.9 |
|  | A. i) and ii) are both true |
|  | B. i) and ii) are both false |
|  | C. i) is true and ii) is false |
|  | D. i) is false and ii) is true |

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| 3) | Consider this code fragment:  a = 2 b = 7 **???**  print(a) # 7 print(b) # 2  Suppose **???** is replaced by one of the fragments below. Which one makes the code print 7 for a and 2 for b? |
|  | A.  a = a - b  b = b + a  a = a - b |
|  | B.  t = a  a = b  b = t |
|  | C.  t = b  a = b  b = t |
|  | D. all of A, B, and C |
|  | E. none of A, B, or C |

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| 4) | Consider this statement:  print(2 **???** (10 % 4))  Consider these 4 operators: +, \*, \*\*, %  How many of the operators can replace **???** so that the statement prints 4? |
|  | A. 0 of the operators |
|  | B. 1 of the operators |
|  | C. 2 of the operators |
|  | D. 3 of the operators |
|  | E. 4 of the operators |

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| 5) | Consider these statements:  i) Python strings can be modified ii) Python lists can be modified |
|  | A. i) and ii) are both true |
|  | B. i) and ii) are both false |
|  | C. i) is true and ii) is false |
|  | D. i) is false and ii) is true |

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| 6) | What does this print?  lst = [2, 0, -1, 1] print(lst[lst[1]]) |
|  | A. 2 |
|  | B. 0 |
|  | C. -1 |
|  | D. 1 |
|  | E. nothing is printed: there is an array indexing error |

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| 7) | What does this print?  S = [2, 1, 3]  T = S  S[2] = 0  print(T) |
|  | A. [2, 1, 3] |
|  | B. [2, 1, 0] |
|  | C. [2, 0, 3] |
|  | D. [0, 1, 3] |

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| 8) | Consider this code:  s = 'lizard'  Which statement prints zar ? |
|  | A. print(s[2:4]) |
|  | B. print(s[2:5]) |
|  | C. print(s[3:5]) |
|  | D. print(s[3:6]) |

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| 9) | Consider these statements:  i) There can be duplicates in the keys of a dictionary. ii) There can be duplicates in the values of a dictionary. |
|  | A. i) and ii) are both true |
|  | B. i) and ii) are both false |
|  | C. i) is true and ii) is false |
|  | D. i) is false and ii) is true |

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| 10) | How many of these three programs print 6? | | |
| **# program 1**  d = {'a':1, 'b':2, 'c':3}  total = 0  for x in d:  total += x  print(total) | **# program 2**  d = {'a':1, 'b':2, 'c':3}  total = 0  for x in d:  total += d[x]  print(total) | **# program 3**  d = {'a':1, 'b':2, 'c':3}  total = 0  for x in range(len(d)):  total += d[x]  print(total) |
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| A. 0 | | |
|  | B. 1 | | |
|  | C. 2 | | |
|  | D. 3 | | |

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| 11) | What does this program print if the user enters house for a and mouse for b?  a = input('a? ')  b = input('b? ')  if not (len(a) != len(b)):  print('yes')  if len(a) == len(b):  print('no')  print('done') |
|  | A.  done |
|  | B.  yes done |
|  | C.  no  done |
|  | D.  yes  no  done |

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| 12) | Assuming both a and b are strings, which code fragment prints 'good' exactly when a and b are different strings of the same length? |
|  | A.  if len(a) == len(b) and a != b:  print('good')  else:  print('bad') |
|  | B.  if len(a) == len(b) or a != b:  print('good')  else:  print('bad') |
|  | C.  if not (len(a) == len(b) and a == b):  print('good')  else:  print('bad') |
|  | D.  if not (len(a) == len(b) or a == b):  print('good')  else:  print('bad') |

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| 13) | What values of a and b make this code print 2?  if a < 0 or b < 0:  print(a)  elif a < b < 0:  print(b)  else:  print(a + b) |
|  | A. a is 2, b is 2 |
|  | B. a is 2, b is -1 |
|  | C. a is -1, b is 2 |
|  | D. a is -1, b is -1 |
|  | E. there are no values of a and b that make the code print 2 |

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| 14) | What function call returns the same value as f('4') ?  def f(c):  result = 0  if c in '0123456789':  if c in '01':  result += int(c)  if c in '02468':  result += int(c)  else:  result += int(c) - 1  else:  result = -1  return result |
|  | A. f('2') |
|  | B. f('3') |
|  | C. f('5') |
|  | D. f('6') |
|  | E. none of the above return the same value as f('4') |

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| 15) | If variables a and b are both strings, what are the possible values of this expression?  (a == b) and (a != b) |
|  | A. it always evaluates to True |
|  | B. it always evaluates to False |
|  | C. depending upon the values of a and b, sometimes it evaluates to True, and sometimes it evaluates to False |

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| 16) | What does this print?  x = 2  result = 0  for i in range(5):  if i > 2:  result += i  print(result) |
|  | A. 7 |
|  | B. 10 |
|  | C. 12 |
|  | D. 15 |

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| 17) | What does this print?  s = 'grads'  result = ''  for i in s:  if i < 'k':  result += i  print(result) |
|  | A. nothing is printed because the final value of result is the empty string |
|  | B. rs |
|  | C. gad |
|  | D. the program crashes when i < 'k' is evaluated |

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| 18) | What does this print?  lst = [4, 0, 9, 1]  result = 0  for i in range(len(lst)):  result += i + lst[i]  print(result) |
|  | A. 6 |
|  | B. 14 |
|  | C. 20 |
|  | D. an int other than 6, 14, or 20 |

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| 19) | What does this print?  result = 'start'  for i in ['up', 'moose', 'elephant', '!']:  if len(i) > len(result):  result = i  print(result) |
|  | A. start |
|  | B. up |
|  | C. moose |
|  | D. elephant |
|  | E. ! |

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| 20) | What does this print?  result = 0  for i in range(5):  for j in range(1, 4):  result += 1  print(result) |
|  | A. 8 |
|  | B. 9 |
|  | C. 15 |
|  | D. 20 |
|  | E. an int other than 8, 9, 15, or 20 |

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| 21) | What does this print?  result = 0  i = 6  while i < 10:  result += i  i += 2  print(result) |
|  | A. 14 |
|  | B. 20 |
|  | C. 30 |
|  | D. an int other than 14, 20, or 30 |
|  | E. it doesn’t print an int |

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| 22) | What does this print?  lst = [5, 4, 4, 5, 4]  i = 4  result = -1  while i >= 0:  if (i + 1) % 2 == 0:  result = i  i += -1  print(result) |
|  | A. 0 |
|  | B. 1 |
|  | C. 2 |
|  | D. 4 |
|  | E. 5 |

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| 23) | What does this print?  s = 'apple'  i = 0  result = ''  while i < len(s):  if s[i] == s[i + 1]:  result += s[i]  i += 1  print(result) |
|  | A. p |
|  | B. pp |
|  | C. ale |
|  | D. nothing: the final value of result is the empty string |
|  | E. nothing: the program crashes when it runs |

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| 24) | What does this print?  s = 'mysterious'  i = 0  flag = False  while not flag:  if s[i] in 'aeiou':  flag = True  i += 2  else:  i += 1  print(s[i]) |
|  | A. e |
|  | B. i |
|  | C. o |
|  | D. r |
|  | E. nothing: the program loops forever and never reaches the print statement |

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| 25) | What does this print?  n = 64  while n > 1:  n = n / 2  print(n) |
|  | A. 0.0 |
|  | B. 0.5 |
|  | C. 1.0 |
|  | D. 2.0 |
|  | E. nothing: the program loops forever and never reaches the print statement |

This is **Code Listing 1**, referred to in the next few question:

def print\_n(s, n): # line 1  
 for i in range(n): # line 2  
 print(s) # line 3

def f(n): # line 4  
 if n % 2 == 0: # line 5  
 return n / 2 # line 6  
 else: # line 7  
 return 3 \* n + 1 # line 8

**Code Listing 1**

def main():  
 a = 3 # line 9  
 b = int(f(a + 1)) # line 10  
 print\_n('hello', b) # line 11

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| 26) | In Code Listing 1, when main() is called, 'hello' is printed twice. |
|  | A. True |
|  | B. False |

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| 27) | In Code Listing 1, main has two local variables. |
|  | A. True |
|  | B. False |

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| 28) | In Code Listing 1, if line 9 is changed to a = 5, then the program prints 'hello' 4 times. |
|  | A. True |
|  | B. False |

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| 29) | In Code Listing 1, int(f(f(50))) evaluates to 76. |
|  | A. True |
|  | B. False |

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| 30) | In Code Listing 1, if line 2 was changed to for i in range(1, n+1), then the program would print the same thing as if the change was not made. |
|  | A. True |
|  | B. False |

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| 31) | In Code Listing 1, if function main() was moved to be defined before function print\_n(), the program would print the same thing as if the change was not made. |
|  | A. True |
|  | B. False |

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| 32) | In Code Listing 1, if lines 9, 10, and 11 had their indent removed so that they each started in the same column as the d in def on line 4, then calling main() would print 'hello' twice. |
|  | A. True |
|  | B. False |

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| 33) | Consider this code:  def reset(n):  n = 0  def test1(x):  x = 1  reset(x)  print(x)  def test2():  n = 1  reset(n)  print(n)  i) Calling test1() prints 0.  ii) Calling test2() prints 0. |
|  | A. i) and ii) are both true |
|  | B. i) and ii) are both false |
|  | C. i) is true and ii) is false |
|  | D. i) is false and ii) is true |

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| 34) | Suppose we want a function that takes a string s as input and returns a string as follows:   * If s *ends* with a newline character, then the returned string is the same as s except that the one newline at the end has been removed. * If s *does not end* with a newline character, then the returned string is the same as s.   Here are two possible implementations of this function: | |
| def chop1(s):  if s == '':  return s  elif s[-1] == '\n':  return s[:-1]  else:  return s | def chop2(s):  n = len(s)  if n == 0:  return s  elif s[n] == '\n':  return s[:n-1]  else:  return s |
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|  | A. both are **correct** implementations | |
|  | B. both are **incorrect** implementations | |
|  | C. chop1 is a **correct** implementation, and chop2 is an **incorrect** implementation | |
|  | D. chop1 is an **incorrect** implementation, and chop2 is a **incorrect** implementation | |

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| 35) | Suppose this line of code correctly opens the non-empty text file named data.txt:  f = open('data.txt')  How can you print the **first** line of data.txt? |
|  | A. print(f[0]) |
|  | B. print(f.read()) |
|  | C. print(f.readline()) |
|  | D. all of the above |

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| 36) | Suppose this line of code correctly opens the text file named data.txt:  f = open('data.txt')  Which statement prints the total number of characters in data.txt ? |
|  | A. print(f) |
|  | B. print(len(f)) |
|  | C. print(f.read()) |
|  | D. print(len(f.read())) |

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| 37) | Suppose this line of code correctly opens the text file named data.txt:  f = open('data.txt') |
|  | A. f is open just for reading |
|  | B. f is open just for writing |
|  | C. f is open for both reading and writing |

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| 38) | Which function returns the index location of an int x in a list lst? |
|  | A.  def linear\_search1(x, lst):  for i in range(len(lst) - 1):  if lst[i] == x:  return i  return -1 |
|  | B.  def linear\_search2(x, lst):  i = 0  while i < len(lst):  if lst[i] == x:  return i  i += 1  return -1 |
|  | C.  def linear\_search3(x, lst):  for i in lst:  if i == x:  return i  return -1 |
|  | D.  def linear\_search4(x, lst):  i = 0  while i < len(lst):  if lst[i] == x:  return i  i += 1  return -1 |

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| 39) | What does this print?  def f(lst, target):  for i in range(len(lst)):  if lst[i] + 5 == target:  return i  return -1  data = [10, 3, 6, 5, 2, 7]  print(f(data, 6)) |
|  | A. -1 |
|  | B. 2 |
|  | C. 5 |
|  | D. 6 |
|  | E. an int other than -1, 2, 5, or 6 |

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| 40) | Here are two possible implementations of a function that is meant to return the sum of the numbers in a list of numbers: | |
| def sum1(lst):  for n in lst:  result += n  return result | def sum2(lst):  result = 0  i = len(lst) - 1  while i >= 0:  result += lst[i]  return result |
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|  | A. both are **correct** implementations | |
|  | B. both are **incorrect** implementations | |
|  | C. sum1 is a **correct** implementation, and sum2 is an **incorrect** implementation | |
|  | D. sum1 is an **incorrect** implementation, and sum2 is a **incorrect** implementation | |

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| 41) | What does this print?  lst = [4, 2, 5, 3, 1]  m = lst[0]  for x in lst:  if x < m:  m += x  print(m) |
|  | A. 1 |
|  | B. 4 |
|  | C. 11 |
|  | D. 15 |
|  | E. an int other than 1, 4, 11, or 15 |

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| 42) | What value of x makes this program print 4?  lst = [2, x, 1, 1, 3, 1, 3]  print(lst.count(lst[1])) # prints 4 |
|  | A. 0 |
|  | B. 1 |
|  | C. 2 |
|  | D. 3 |
|  | E. an int other than 0, 1, 2, or 3 |

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| 43) | What does this print?  A = [2, 2, 1, 1, 2, 2]  B = [A.count(1), A.count(2)]  print(B.count(1) + B.count(2)) |
|  | A. 0 |
|  | B. 1 |
|  | C. 2 |
|  | D. 3 |
|  | E. an int other than 0, 1, 2, or 3 |

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| 44) | If you run binary search on this list, what is the first value the search checks?  [4, 5, 7, 9, 10, 11, 15, 16, 20] |
|  | A. 4 |
|  | B. 9 |
|  | C. 10 |
|  | D. 11 |
|  | E. an int other than 4, 9, 10, or 11 |

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| 45) | Consider these statements:  i) Linear search requires that the data it is searching be in sorted order.  ii) Binary search requires that the data it is searching be in sorted order. |
|  | A. i) and ii) are both true |
|  | B. i) and ii) are both false |
|  | C. i) is true and ii) is false |
|  | D. i) is false and ii) is true |

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| 46) | In the worst case, about how many comparisons does **selection sort** do to sort a list of ints? |
|  | A. |
|  | B. |
|  | C. |
|  | D. |
|  | E. |

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| 47) | In the worst case, about how many comparisons must be done to test if a list of ints is in ascending sorted order? |
|  | A. |
|  | B. |
|  | C. |
|  | D. |
|  | E. |

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| 48) | What does this print?  count = 0  for i in range(10):  if i % 2 == 0:  count += 1  print(count) |
|  | A. 5 |
|  | B. 6 |
|  | C. 9 |
|  | D. 10 |
|  | E. an int other than 5, 6, 9, or 10 |

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| 49) | What does this print?  count = 0  for i in range(10):  for j in range(15):  count += 1  print(count) |
|  | A. 23 |
|  | B. 25 |
|  | C. 126 |
|  | D. 150 |
|  | E. an int other than 23, 25, 126, or 150 |

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| 50) | What does this print?  count = 0  for i in range(5):  for j in range(5):  if i != j:  count += 1  print(count) |
|  | A. 5 |
|  | B. 12 |
|  | C. 20 |
|  | D. 25 |
|  | E. an int other than 5, 12, 20, or 25 |

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| Algorithm performance measurement: graphs, sorting, running time | |
| 51) | Which graph best describes the worst-case running-time of the selection sort algorithm?  For each graph, the vertical y-axis is running time, and the horizontal x-axis is the number of items being sorted. |
|  | A. A red line on a white background  # of items |
|  | B. A purple line on a white background  # of items |
|  | C. A blue line on a white background  # of items |
|  | D. A green line in a white background  # of items  running time  running time  running time  running time |

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| 52) | What is a recursive function? |
|  | A. a function that is called multiple times by other functions |
|  | B. a function that has no loops |
|  | C. a function that calls itself |
|  | D. a function that calls itself, and does not call any other functions |

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| 53) | Consider these statements:  i) Any recursive can be re-written as an equivalent function that doesn’t use recursion.  ii) Any function that uses loops can be re-written as an equivalent function (or functions) that uses recursion instead of loops. |
|  | A. i) and ii) are both true |
|  | B. i) and ii) are both false |
|  | C. i) is true and ii) is false |
|  | D. i) is false and ii) is true |

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| 54) | What does this print?  def g(n):  if n <= 0:  return 0  else:  return g(n - 2) + n  print(g(5)) |
|  | A. 9 |
|  | B. 10 |
|  | C. 13 |
|  | D. 15 |
|  | E. an int other than 9, 10, 13, or 15 |

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| 55) | What does this print?  def h(n):  if n == 0:  return 0  else:  return h(n - 1)  print(h(1000)) |
|  | A. 0 |
|  | B. 1 |
|  | C. 999 |
|  | D. 1000 |
|  | E. none of the above |

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| 56) | Who was the original creator of Python? |
|  | A. Guido van Rossum |
|  | B. Dennis Ritchie |
|  | C. James Gosling |
|  | D. Brendan Eich |

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| 57) | Which application is **NOT** a good fit for Python? |
|  | A. data science, e.g. processing and displaying data |
|  | B. machine learning scripting, e.g. processing data and running learning algorithms |
|  | C. high-performance real-time systems, such as airplane control software |
|  | D. back-end web development |

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| 58) | What does this print?  lst = [1, 4, 3, 2, 5]  lst[1:4].sort()  lst.reverse()  print(lst[1] - lst[3]) |
|  | A. -1 |
|  | B. -2 |
|  | C. 1 |
|  | D. 2 |

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| 59) | What does this print?  numbers = [1, 2, 3, 4, 5]  numbers[2:3] = [6, 7]  print(numbers) |
|  | A. [1, 2, 6, 7, 3, 4, 5] |
|  | B. [1, 2, [6, 7], 4, 5] |
|  | C. [1, 2, 6, 7, 4, 5] |
|  | D. the code prints nothing due to an error |

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| 60) | What does this print?  a, b, c, = 1, 'two', [3, 4]  c, a, b = b, c, a  print(2\*a, 2\*b, 2\*c) |
|  | A. [6, 8] 2 twotwo |
|  | B. [3, 4, 3, 4] 2 twotwo |
|  | C. [3, 4] 1 two |
|  | D. the code prints something, but none of the above |
|  | E. the code prints nothing due to an error |