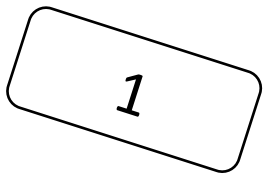
Computer Science 217

Midterm Exam #2

March 25, 2025



First Name: _____

Last Name: _____

ID: _____

Instructions:

- Neatly print your names and ID number in the spaces above.
- Neatly print your names and ID number on all of the bubble sheets.
- Shade the circles for your ID number on all of the bubble sheets.
- Record your answer for questions 1 and 2 on the appropriate bubble sheets. Record your answers for questions 3 to 22 on the traditional five-answer multiple-choice bubble sheet.
- Ensure that any errors made when recording answers on the bubble sheets are erased completely. Replacement bubble sheets are available if you are unable to completely erase your undesired response.
- Pick the **best answer** for each multiple-choice question.
- This exam consists of 9 pages, including the cover. Before answering any questions, count the pages and ensure that they are all present.
- The back page of this exam booklet is blank. It can be used for rough work.
- You have 60 minutes to complete this exam. Extra time will **not** be provided to record your answers on the bubble sheets. Ensure that all of your answers have been recorded before the time limit is reached.
- Unless noted otherwise, each question is worth one mark.
- This exam is closed book. You are not permitted to use any electronic devices or reference materials.
- **DO NOT TURN PAST THIS PAGE UNTIL YOU ARE INSTRUCTED TO BEGIN.**

Record the answers to the questions on this page on the provided bubble sheet.
Answers recorded in this question booklet will NOT be graded.

1. [8 marks] In this question, you will create a function that computes the total cost of items being purchased by a shopper. The function will take 3 parameters, each of which is a list. The first parameter will be a list of prices, the second will be a list of quantities, and the third will be a list of Boolean values that indicate whether or not the item is taxable. The function should compute the total for all of the items by multiplying the cost of each item by its quantity and applying 5% tax to it if it is a taxable item. The total cost for the transaction should be returned as the function's only result. If the lengths of the lists received as parameters are unequal, then -1 should be returned to indicate that there was a problem with the arguments provided to the function.

   Example function calls and their expected results are shown below.

   computeTotal([], [], []) should return 0.00
   computeTotal([1.99], [1], [False]) should return 1.99
   computeTotal([5.00, 10.00], [2, 1], [True, True]) should return 21.00
   computeTotal([1.00, 2.00, 3.00], [3, 2, 1], [True, False, True]) should return 10.30
   computeTotal([1.99, 3.49], [1, 3], [False]) should return -1
   computeTotal([1.99, 3.49], [3], [False, True]) should return -1

   Use the following lines to construct your solution. Record your answer onto the provided bubble sheet. Ensure that you follow the dashed vertical lines for any indented statements and that you shade the digits associated with each statement that you use. Statements can be used more than once. Some statements may not be needed. Any lines on the bubble sheet where a statement number is not shaded will be ignored.

   1: current_cost = cost * count
   3: current_cost = cost[i] * count[i]
   5: current_cost = cost * count * 1.05
   7: current_cost = cost[i] * count[i] * 1.05
   9: current_cost = cost * count + 5%
   13: current_cost = cost[i] * count[i] + 5%
   15: def computeTotal():
   17: def computeTotal(cost, count, taxable):
   19: else:
   23: for i in cost:
   25: for i in range(cost):
   27: for i in range(len(cost)):
   29: if len(cost) != len(count) and len(cost) != len(taxable):
   35: if len(cost) != len(count) or len(cost) != len(taxable):
   37: if taxable[i]:
   39: if taxable[i] == "True":
   45: return -1
   47: return 0
   49: return total
   57: total = 0
   59: total = total + 1
   67: total = total + current_cost

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2. [4 marks] In this question, the intersection of two lists, a and b, will be defined to be a list of elements that contains all of the elements that are present in both a and b without any repeated values. Your task is to write a function that computes the intersection of two lists which will be provided as parameters and return the intersection of those lists as the function's only result.

   Example function calls and their expected results are shown below.

   intersection([], []) should return []
   intersection([1], []) should return []
   intersection([], [1, 2]) should return []
   intersection([3, 1], [1, 2]) should return [1]
   intersection([3, 1, 2], [1, 2, 3]) should return [3, 1, 2]
   intersection([1, 1, 1], [1]) should return [1]
   intersection([1, 1, 1, 2, 2, 2], [1, 2, 2, 2]) should return [1, 2]
   intersection([1, 2, 3, 4, 5, 6], [6, 4, 2]) should return [2, 4, 6]

   Use the following lines to construct your solution. Record your answer onto the provided bubble sheet. Ensure that you follow the dashed vertical lines for any indented statements and that you shade the digits associated with each statement that you use. Statements can be used more than once. Some statements may not be needed. Any lines on the bubble sheet where a statement number is not shaded will be ignored.

   2: common = []
   4: common.append(a)
   6: common.append(b)
   8: common.append(v)
   12: def intersection():
   14: def intersection(a, b):
   16: else:
   18: for i in range(a):
   24: for v in a:
   26: if (v in common) == False:
   28: if v in a:
   34: if v in b:
   36: return common
   38: return []

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3. Consider the following code segment:

```
a = 0
while a < 6:
  print("X")
  if a == 2:
    a = a + 1
  elif a == 3:
    a = a + 2
  a = a + 1
```

How many copies of the letter X are displayed when it executes?

A. 2
B. 3
C. 4
D. 5
E. 6

4. Which of the following statements is most correct?
   A. A for loop is an example of a pre-tested loop.
   B. Every while loop can be re-written as a for loop.
   C. When a for loop executes, it always counts from a smaller integer to a larger integer (increasing by one or more with each iteration).
   D. More than one of the above statements is correct.
   E. None of the above statements is correct.

5. Consider the following code segment:

```
result = 1

for i in range(1, 6, 2):
  result = result + i

print(result)
```

What value is displayed when it executes?

A. 4
B. 10
C. 16
D. 22
E. None of the above values is correct

Record the answers to the questions on this page on the provided bubble sheet.
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6. Consider the following program:

```
for num in _____________________:
  print(num)
```

It is supposed to count backwards, down from 100 to (and including) 1, displaying each integer.
What should be placed in the blank so that it performs its intended task?

A. range(100, 0, -1)
B. range(100, 1, -1)
C. range(101, 0, -1)
D. range(101, 1, -1)
E. None of the above answers are correct.

7. Which of the following tasks would be best suited to a nested loop?
   A. Computing the sum of all of the even values between 1 and an integer entered by the user.
   B. Displaying a smooth color gradient where each column in the window is given a slightly different color.
   C. Drawing a collection of black and white squares for a chess board.
   D. Printing the values of the powers of two from 2^1 to 2^{32}.
   E. Reading values from the user until a blank line is entered.

8. What is the value of x after the following code segment executes?

```
x = 0

for i in range(0, 3):
  for j in range(3, 7, 2):
    x = x + 1
```

A. 0
B. 4
C. 6
D. 9
E. 12

9. What is the last value printed by the following code segment?

```
q = 6
while q > 2:
  q = q / 2
  for i in range(2):
    print(q - i)
```

A. 0.5
B. 1.5
C. 2.0
D. 2.5
E. 3.0

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10. Which of the following is **not** a function?
    A. float
    B. if
    C. input
    D. print
    E. range

11. Consider the following program:

```
def f(a, b):
  result = a + b

f(10, 12)
print(result)
```

    What is displayed when it executes?
    A. 0
    B. 10
    C. 12
    D. 22
    E. An error message is displayed.

12. Which of the following statements is most correct?
    A. If a default value is provided for one a function's parameters, then a default value must be provided for all of a function's parameters.
    B. Parameter variables are an optional aspect of a function's definition.
    C. When a function's body includes a return statement, it must be the last statement in the function's body.
    D. Exactly two of the above statements is correct.
    E. Answers A, B and C are all correct.

13. What are the arguments in the following code segment?

```
def fname(x=0, y=-2):
  r = x + y
  return r

s = fname(1, 3)
```

    A. def and fname
    B. r and s
    C. x and y
    D. 0 and -2
    E. 1 and 3

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Consider the following code segment for the next two questions:

```
def f(a, b):
  return a - b

def g(q, r):
  return q + r

def h(x, y, z):
  if x + y + z == 0:
    r = f(x, y) + g(x, z)
  else:
    r = g(z, 3)

  return r

a = int(input())
b = int(input())
c = int(input())
num = h(a, b, c)
print(num)
```

14. What output is displayed if the user enters 1 for a, 2 for b, and 3 for c?
    A. -6
    B. -3
    C. 0
    D. 3
    E. 6

15. What output is displayed if the user enters 1 for a, 2 for b, and -3 for c?
    A. -6
    B. -3
    C. 0
    D. 3
    E. 6

16. Which of the following statements is most correct?
    A. Functions facilitate code reuse.
    B. Functions allow low-level details to be set aside while higher-level aspects of the problem are considered.
    C. Functions make programs more difficult to maintain.
    D. Exactly two of the above statements is correct.
    E. Answers A, B and C are all correct.

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17. Consider a program that reads integers from the user until a blank line is entered. Which of the following tasks will need to use a list to successfully compute the result?
    A. Printing the average of the values that were entered.
    B. Printing the number of zeros that were entered.
    C. Printing the values that were entered in sorted order.
    D. Exactly two of the above answers is correct.
    E. Answers A, B and C are all correct.

18. Consider the following code segment:

```
values = ["B", "o", "b"]
values[3] = "!"
print(values)
```

    What is displayed when it executes?

    A. Bob
    B. Bob!
    C. ["B", "o", "b"]
    D. ["B", "o", "b", "!"]
    E. None of the above answers are correct.

19. Consider the following code segment:

```
data = [3, 1, 4, 1, 5, 9]
for i in _____:
  print(data[i])
```

    What should be placed in the blank so that the code segment displays each of the values in data on its own line?
    A. data
    B. data + 1
    C. len(data) + 1
    D. range(len(data))
    E. range(1, len(data) + 1)

20. Consider the following code segment:

```
items = ["a", "d", "f"]
```

    Which of the following statements can be executed to cause items to become ["a", "s", "d", "f"]?
    A. items.append("s")
    B. items.insert(1, "s")
    C. items.insert(2, "s")
    D. items.insert("s", 3)
    E. items.insert("s", 4)

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21. Consider the following list:

```
values = [[7, 8, 9], \
          [4, 5, 6], \
          [1, 2, 3]]
```

Which of the following statements prints 2?

A. print(values[1,2])
B. print(values[1][2])
C. print(values[2:1])
D. print(values[2][1])
E. print(values[3:2])

22. Consider the following code segment:

```
values = []

for i in range(3):
  values.append([i, i+1])
```

What is in values after it executes?

A. [0, 1, 2]
B. [0, 1, 1, 2, 2, 3]
C. [[0, 1], [1, 2], [2, 3]]
D. [[0, 1], [1, 2], [2, 3], [3, 4]]
E. [[0, 1], [2, 3], [4, 5]]