

Computer Science 217

Midterm Exam #1

Winter 2026

February 24, 2026

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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 both of the provided bubble sheets and shade the circles for your ID number on both of the bubble sheets.
- Record your answer for question 1 on the appropriate bubble sheet. Record your answers for questions 2 to 19 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 8 pages, including the cover. Before answering any questions, count the pages and ensure that they are all present.
- 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.

Question #1:

[12 marks] Consider a simple calculator that can compute the sum, product, and quotient of two floating-point numbers. (The difference has been intentionally omitted to make the program shorter). The user will begin by entering the operator which will be one of '+', '*', and '/'. Then the operand that appears to the left of the operator will be entered, followed by the operand to the right of the operator. Once these operands have been entered the result of applying the operator to the operands will be computed and displayed.

Create a program that implements the calculator described in the previous paragraph. Your program should continue to read operators and operands until the user enters a blank line for the operator. When a blank line is entered, your program should terminate without reading any further operands or displaying any further results. If the first operator entered is a blank line, then the program will not display any output (other than the prompt before the operator was read). You should assume that the operator entered is always correct – you don't need to check for or respond to an invalid operator.

Your program needs to consider the possibility that the user might attempt to divide by 0. When this occurs (because the right operand is zero), your program should display an appropriate error message before continuing to read another operator. Do not display the result of the calculation when the user attempts to divide by zero.

Hint: I found it easiest to check for division by zero first, and if it occurred, display the error message. Otherwise, my solution computed the result of applying the operator to the operands and displayed the result.

Sample input and output is shown below. The values that were entered by the user are shown in bold.

```
Enter an operator: +  
Enter the left operand: 2  
Enter the right operand: 1  
2.0 + 1.0 is 3.0.  
Enter an operator: <blank line>
```

Additional sample input and output is shown below:

```
Enter an operator: /  
Enter the left operand: 5  
Enter the right operand: 0  
Error: Division by 0  
Enter an operator: /  
Enter the left operand: 5  
Enter the right operand: 2  
5.0 / 2.0 is equal to 2.5.  
Enter an operator: <blank line>
```

The expected output when the first value entered is a blank line is shown below:

```
Enter an operator: <blank line>
```

The statements needed to solve this problem can be found on the next page.

Record the answers to the questions on this page on the provided bubble sheet.
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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 blank lines on the bubble sheet will be ignored.

```
1: elif op == "*":
3: elif op == "+":
5: else:
7: if op == "+":
9: if op == "/" and right == 0:
12: if op == "/" or right == 0:
14: left = float(input("Enter the left operand: "))
16: left = input(float("Enter the left operand: "))
18: op = input("Enter an operator: ")
23: op = int(input("Enter an operator: "))
25: print("Error: Division by 0")
27: print(f"{left} {op} {right} is equal to {result}.")
29: result = left * right
34: result = left + right
36: result = left - right
38: result = left / right
45: result = left x right
47: right = float(input("Enter the right operand: "))
49: right = input(float("Enter the right operand: "))
56: while op != "":
58: while op == "":
```

Record the answers to the questions on this page on the provided bubble sheet.
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2. Which of the following is a mechanical computer that was designed in the 1840s but wasn't actually completed until 1991?
 - A. Abacus
 - B. Babbage Difference Engine
 - C. ENIAC
 - D. Harvard Mark I
 - E. IBM Automatic Sequence Controlled Calculator
3. Which statement about Moore's law is most correct?
 - A. Moore's law applied from the early 1940s to the mid 1990s.
 - B. Moore's law describes the relationship between the physical size of a computer and its speed.
 - C. Moore's law explains why computers are commonly built from vacuum tubes instead of transistors.
 - D. Moore's law predicted that the amount of power consumed by computer chips would halve every 10 years.
 - E. Moore's law stated that the complexity of computer chips would increase while their cost would not.
4. The halting problem is a particularly famous problem in which area of computer science?
 - A. Artificial Intelligence
 - B. Distributed Systems
 - C. Game Development
 - D. Information Security
 - E. Theory of Computation
5. Which level of competence in Bloom's Taxonomy is characterized by the ability to compare multiple solutions and identify the strengths and weaknesses of each?
 - A. Analysis
 - B. Application
 - C. Comprehension
 - D. Evaluation
 - E. Synthesis
6. Which of the following items is a legal / valid variable name in Python? (The name doesn't have to be a 'good' name, just a legal / valid one.)
 - A. three
 - B. A
 - C. _a_b_c
 - D. Exactly two of the above answers is correct
 - E. Answers A, B and C are all correct

Record the answers to the questions on this page on the provided bubble sheet.
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7. Consider the following program. It is supposed to read the number of students that are in a class and report the number of TAs that should be allocated to that class as one TA for each group of 25 students (or part thereof). The line of code that reads the number of students from the user has been removed and replaced with a blank.

```
import math
STUDENTS_PER_TA = 25
```

```
_____ # Blank that needs to be filled in
```

```
num_tas = math.ceil(num_students / STUDENTS_PER_TA)
print(f"{num_tas} TAs should be assigned to that class.")
```

Which of the following statements is the **best** choice to fill in the blank and have the program perform its intended task?

- A. `num_students = float(input("How many students are in the class? "))`
 - B. `num_students = input("How many students are in the class? ")`
 - C. `num_students = int(input("How many students are in the class? "))`
 - D. `num_tas = float(input("How many students are in the class? "))`
 - E. `num_tas = input("How many students are in the class? ")`
8. An error, where a program runs to completion, but reports an incorrect result, would best be described as a:
- A. Logic error
 - B. Name error
 - C. Runtime error
 - D. Syntax error
 - E. Value error
9. Assume the variables `a` and `b` have been assigned values with the following statements:

```
a = 1.41421356237
b = 1.73205080757
```

Which of the following statements will result in this output?

```
(1.7321, 1.41)
```

- A. `print(f"({a:.2f}, {b:.4f})")`
- B. `print(f"({a:.4f}, {b:.2f})")`
- C. `print(f"({b:.2f}, {a:.4f})")`
- D. `print(f"({b:.4f}, {a:.2f})")`
- E. `print(f"({b:.4f}, {a:.2f})")`

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10. What is 55_{10} in base 3?
- A. 101_3
 - B. 102_3
 - C. 201_3
 - D. 1002_3
 - E. 2001_3
11. What is $A0B_{12}$ in base 10?
- A. 1451_{10}
 - B. 1572_{10}
 - C. 1594_{10}
 - D. 1704_{10}
 - E. None of the above answers are correct
12. Consider the conversion of an integer value from one base to another when neither base is 10. Which pairs of bases would allow that conversion to be performed by constructing a table and looking up each digit or group of digits in the table rather than performing multiplication and division?
- A. 2 and 8
 - B. 3 and 6
 - C. 4 and 8
 - D. Exactly two of the above answers is correct
 - E. Answers A, B and C are all correct
13. Which of the following statements is most correct?
- A. All ASCII characters have the same size.
 - B. All UTF-8 characters have the same size.
 - C. Every Extended ASCII character is 16 bits.
 - D. The valid sizes for UTF-8 characters are 7, 14, 21 and 28 bits.
 - E. More than one of the above statements is correct.
14. Which of the following is **not** a relational operator in Python?
- A. $!=$
 - B. $<=$
 - C. $=$
 - D. $>$
 - E. None of the above answers is correct (Answers A, B, C and D are all relational operators)
15. What is the value of the following expression?
- $$6 / 3 != 8 / 4 \text{ or } 8 > 7 \text{ and } 4 - 5 < 5 - 4$$
- A. False
 - B. True
 - C. -1
 - D. 1
 - E. 2.0

16. Consider the following code segment:

```
a = int(input("Enter an integer: "))

if a == 0:
    print("Zero")
    a = a + 1
elif a > 0:
    print("More")

print("Less")
```

What word or words is/are printed when it is executed and the user enters 0?

- A. Only 'Less'
- B. Only 'Zero'
- C. 'Zero' followed by 'Less'
- D. 'Zero' followed by 'More'
- E. 'Zero' followed by 'More' followed by 'Less'

17. Consider the following code segment:

```
a = int(input("Enter an integer: "))
b = int(input("Enter another integer: "))

if a < b:
    print("Q")
    a = a + 1
    if a == 0:
        print("R")
        b = b + 1
    else:
        print("S")
elif b > 0:
    print("T")
```

If the user enters -1 for a and 0 for b, which letter(s) is/are printed by the program?

- A. Q (only)
- B. Q and R
- C. Q and S
- D. Q, R and T
- E. T (only)

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18. Consider the following code segment:

```
x = 0

while x < 10:
    print("A")
    x = x * 2
```

How many copies of the letter A are printed when this code segment executes?

- A. 0
- B. 4
- C. 5
- D. 10
- E. None of the above answers are correct

19. Consider the following code segment:

```
x = 0
y = 0

while x < 6:
    x = x + 1
    if x == 2 or x == 4:
        x = x + 1
    else:
        y = y + 1

print(x, y)
```

What is printed when it executes?

- A. 0 0
- B. 6 0
- C. 6 2
- D. 6 6
- E. 7 3