

# Computer Science 217

## Midterm Exam

Fall 2009

October 29, 2009

Name: \_\_\_\_\_

ID: \_\_\_\_\_

### Instructions:

- Neatly print your name and ID number in the spaces provided above.
- Pick the best answer for each multiple choice question.
- Answer each question by writing the correct answer in the space provided. **Answer all multiple choice questions using UPPER CASE letters.**
- This exam consists of 11 pages, including the cover. Before answering any questions count the pages and ensure that they are all present.
- You have 1 hour 15 minutes to complete this exam.
- 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**

1. The area of computer science that studies techniques for coordinating the behavior of many computers, and problems such as race conditions and deadlock is known as:
- A. Distributed Systems
  - B. Human Computer Interaction
  - C. Information Visualization
  - D. Software Engineering
  - E. Theory of Computation

Answer: \_\_\_\_\_

2. Early electronic computers, such as ENIAC, were constructed using:
- A. Bridges
  - B. Pipes
  - C. Relays
  - D. Transistors
  - E. Vacuum Tubes

Answer: \_\_\_\_\_

3. In a modern computer, which of the following components is **not** normally connected to the north bridge?
- A. Central Processing Unit
  - B. Graphics Subsystem
  - C. Keyboard
  - D. Main Memory (RAM)
  - E. None of the above answers are correct

Answer: \_\_\_\_\_

4. The process of breaking a problem down into 3 to 5 steps, and then repeating the process for steps that are still too complex is referred to as:
- A. Evaluation
  - B. Programming
  - C. Software Engineering
  - D. Synthesis
  - E. Top Down Design

Answer: \_\_\_\_\_

5. Within Bloom's Taxonomy, the level of comprehension that is characterized by the ability to infer causes or predict consequences is known as:

6. (2 marks) Consider the following list of variable names that are being considered for use in a Python program. Some of these names can be used in a Python program, while others are illegal. Circle all of the names that are **allowed** to be used.

3aas	ComputerScienceDepartment	_exam_count
follow-up	if	print
r2d2	Then	zzz

7. Which of the following statements is most correct?
- A. Python is a low level programming language that exposes many details of the computer's hardware.
  - B. Python has been used in industry to create successful products.
  - C. The shortest correct Python program that can be created is 3 lines long.
  - D. Exactly two of the above answers are correct.
  - E. Answers A, B, and C are all correct.

Answer: \_\_\_\_\_

8. Which of the following statements is most correct?
- A. When a program is compiled, the resulting executable file can be executed on any type of computer.
  - B. Using a virtual machine provides the best method of protecting the source code for your program from competitors.
  - C. Using a virtual machine generally provides superior performance to a compiled executable.
  - D. More than one of the above answers is correct.
  - E. None of the above answers are correct.

Answer: \_\_\_\_\_

9. Consider the following expression that could appear in a Python program.

```
z = 2 + 2 ** 2 * 2 - 2
```

After it is evaluated, the value of z will be: \_\_\_\_\_

10. Consider a program that generates some output and then crashes. The error in this program would be classified as a:
- A. Condition Error
  - B. Logic Error
  - C. Path Error
  - D. Runtime Error
  - E. Syntax Error

Answer: \_\_\_\_\_

11. Consider the following code segment:

```
a = raw_input()  
b = input()  
c = a + b  
print c
```

When the program is run, the user first enters 10 and then 5. The output generated by the program will be:

- A. 5
- B. 10
- C. 15
- D. 105
- E. None of the above answers are correct

Answer: \_\_\_\_\_

12. Consider a program that includes a variable named  $x$  which contains a floating point number. Write a **single** line of code that uses a format specifier to display the value of  $x$ , rounded to 3 decimal places.

13. Convert 221 base 5 to base 10.

Answer: \_\_\_\_\_

14. Convert 157 base 10 to hexadecimal.

Answer: \_\_\_\_\_

15. (2 marks) Convert 365 base 7 to base 4.

Answer: \_\_\_\_\_

16. (2 marks) Convert 330 base 4 to base 9.

Answer: \_\_\_\_\_

17. What was the primary motivation for developing UTF-8?

18. Consider the following sequence of bits: 0100 1010 1101 1111 0110 1010 1011 1100.

Inside of a computer, these bits will always be treated as:

- A. A character
- B. A color
- C. A real number
- D. An integer
- E. None of the above answers are correct

Answer: \_\_\_\_\_

19. Consider the logical expression  $(A \text{ and } (\text{not } B)) \text{ or } C$ . In the truth table for this expression, the number of rows for which the expression evaluates to true is:

Answer: \_\_\_\_\_

Consider the following code segment:

```
x = input()

if (x < 2000):
    print "A"
elif (x < 1000):
    print "B"
else:
    print "C"
```

20. If the user enters 500 for x then the output from this program will be: \_\_\_\_\_

21. If the user enters 2000 for x then the output from this program will be: \_\_\_\_\_

Consider the following code segment:

```
x = input("Enter x: ")
y = input("Enter y: ")

if x >= 2:
    y = y + 1
    print x
    if y > 3:
        x = x - 1
        print y
    x = x - 1
elif x == 1:
    print x
    x = x + 1

if y <= 3:
    print x
else:
    print y
```

22. If the user enters 1 and 3 when prompted, the output from this program will be: \_\_\_\_\_
23. If the user enters 3 and 1 when prompted, the output from this program will be: \_\_\_\_\_
24. If the user enters 2 and 2 when prompted, the output from this program will be: \_\_\_\_\_
25. Which of the following operators has the highest precedence?
- A. !=
  - B. <
  - C. +
  - D. \*
  - E. and

Answer: \_\_\_\_\_

26. What level of white-box test coverage provides the greatest level of assurance that your program is free of bugs?
- A. Condition coverage
  - B. Graph coverage
  - C. Heuristic coverage
  - D. Path coverage
  - E. Statement coverage

Answer: \_\_\_\_\_



27. Consider the following Python code segment:

```
if a < b:
    print "That's good..."
elif a >= b:
    print "Even better!"

if c == d:
    print "c is equal to d!"

print "All done!"
```

How many test cases are required to achieve path level test coverage for this code segment? \_\_\_\_

28. Which of the following statements is most correct?

- A. In Python, both while loops and for loops are pre-tested loops.
- B. In Python, while loops are pre-tested loops. For loops are post-tested loops.
- C. In Python, while loops are post-tested loops. For loops are pre-tested loops.
- D. In Python, both while loops and for loops are post-tested loops.
- E. None of the above statements are correct.

Answer: \_\_\_\_

Consider the following code segment. Recall that when the % operator is applied to two integers it computes the remainder of dividing the left number by the right number.

```
a = input()
b = input()

while (a < b):
    a = a + 1
    if (a % 2) == 0:
        b = b - 2

print (a + b)
```

29. If the user enters 0 for a, and 0 for b, then the value displayed by the program will be: \_\_\_\_\_

30. If the user enters 2 for a and 10 for b, then the value displayed by the program will be: \_\_\_\_\_

31. If the user enters 5 for a and 10 for b, then the value displayed by the program will be: \_\_\_\_\_

32. How many copies of the letter X does the following program display?

```
for i in range(1, 1000):
    j = 0
    while (j < 5):
        print "X"
        j = j + 1
```

Answer: \_\_\_\_

33. (12 marks) Write a program that draws the first n rows of a number triangle where each row is represented by the numbers 1 .. row\_number .. 1. For example, if the user entered 4, your program should output the following 4 rows:

```
1
1 2 1
1 2 3 2 1
1 2 3 4 3 2 1
```

Similarly, if the user entered 6 for n then your program should output:

```
1
1 2 1
1 2 3 2 1
1 2 3 4 3 2 1
1 2 3 4 5 4 3 2 1
1 2 3 4 5 6 5 4 3 2 1
```

As a final example, if the user entered 1 then your program should output:

```
1
```

If the user enters a value for n that is less than or equal to zero then your program should display a meaningful error message. No numeric output should be displayed if the error message is generated. Provide an appropriate prompt for the user.

Hint: print statements in Python normally print whatever values have been requested, and then move down to the next line. If you want to print something and remain on the same line, include a comma as the last character on the line. For example:

```
print "Hello World"
```

displays Hello World and moves down to the next line, while

```
print "Hello World",
```

displays Hello World without moving down to the next line.

Your program does **not** need to include comments. Please take care to write clearly. If we can't read your solution then we can't give you credit for it.

Place your answer to the programming question on this page.