CS303E Week 5 Worksheet: Loops

Name: _____ EID: _____

Read the questions carefully, and answer each question in the space provided. Use scratch paper to do your work and then copy your answers neatly and legibly onto the test paper. Only answers recorded on the test paper will be graded.

1. (10 points: 1 point each) The following are true/false questions. **Write either T or F in the boxes at the bottom of page 1.** If there's any counterexample, it's false.

   (a) The break statement can be used to exit a loop prematurely.

   (b) It is possible to use the break statement to exit multiple nested loops at once.

   (c) The continue statement is used to skip the remaining code within the current iteration of a loop and move to the next iteration.

   (d) The sequence generated from `range(n)`, where `n` is an integer, starts at 1 and goes up to (but does not include) `n`.

   (e) Nested loops require using both for and while loops.

   (f) Infinite loops occur when the condition controlling the loop never becomes false or when there is no exit statement within the loop body.

   (g) The body of a while loop in Python is always guaranteed to execute at least once.

   (h) A while True loop will run indefinitely until a break statement is encountered or an error occurs within the body.

   (i) The loop condition in a while loop is evaluated before each iteration.

   (j) The loop control variable in loops like `for x in range(2)` can be accessed outside the loop.

a	b	c	d	e	f	g	h	i	j

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Questions 2-6 are multiple choice. Each counts 2 points. **Write the letter of the BEST answer in the box on the next page. Please write your answer in UPPERCASE. Each problem has a single answer.**

2. Which of the following statements about the `range()` function in Python is true?

   A. The `range()` function can generate sequences of both numbers and strings.

   B. The `range()` function provides an option for randomization in for loops.

   C. The `range()` function can generate both contiguous and non-contiguous sequences of numbers in ascending or descending order.

   D. The `range()` function can only be used with `for` loops and not with `while` loops.

3. When would you typically use a `while` loop instead of a `for` loop?

   A. When you need to iterate over a known sequence of elements.

   B. When the number of iterations is fixed and predetermined.

   C. When the loop requires an exit condition that is not based on the number of iterations.

   D. When you want to execute a block of code at least once.

4. What is the purpose of nested loops?

   A. Nested loops allow for more efficient memory utilization.

   B. Nested loops are used to handle errors and exceptions that may occur during loop execution.

   C. Nested loops enable complex patterns of iteration by placing loops inside each other.

   D. Nested loops have no purpose. You can use a single loop in any instance you use nested loops.

5. In a `for` loop statement like `for x in range(3)`, can you modify the value of the loop variable `x` within the loop body to change the number of iterations?

   A. Yes, the loop variable `x` can be modified within the loop body to change the number of iterations.

   B. No, modifying the loop variable `x` directly within a `for` loop will not affect the number of iterations.

   C. No, modifying the loop variable `x` will cause an error and terminate the loop.

   D. The loop variable `x` can only be modified indirectly using additional variables.

6. What is the main difference between loops and conditionals (`if/elif/else`) in programming?

   A. Loops are used to execute a block of code repeatedly, while conditionals are used to make decisions based on different conditions.

   B. Loops and conditionals are interchangeable and can be used interchangeably in any programming scenario.

   C. Conditionals cannot be nested inside other conditionals, but loops can be nested inside other loops.

   D. Conditionals are used to iterate over a sequence of values, while loops are used to check for specific conditions and execute code accordingly.

2	3	4	5	6

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The following 7 questions require you to trace the behavior of some Python code and identify the output of that code. For each question, write the output for the code segment on the provided line.

7. (3 points)

```
count = 1
while count <= 10:
    if count % 3 == 0:
        count += 2
        continue
    print(count, end=" ")
    count += 1
```

8. (3 points)

```
for i in range(4):
    for j in range(i):
        print(i + j, end=" ")
```

9. (3 points)

```
count = 0
while count < 5:
    print(count, end=" ")
    if count == 2:
        break
    count += 1
```

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10. (3 points)

```
for i in range(1, 10, 2):
    print(i, end=" ")
```

11. (3 points)

```
num = 10
while num > 0:
    if num % 2 == 0:
        num -= 1
    else:
        num += 1
    print(num, end=" ")
```

12. (3 points)

```
my_sum = 0
for i in range(1, 5):
    my_sum += i

print(i)
```

13. (3 points)

```
x = 10
while x in range(10, 5, -2):
    print("Kookie", end = " ")
    x -= 4
```

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