CS303E Week 4 Worksheet: Selections

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. (12 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) `bool("True")` evaluates to True.

   (b) `bool("False")` evaluates to False.

   (c) "True" and True are different types of objects.

   (d) The only possible Boolean values are True, False, and None.

   (e) None and "None" are equivalent.

   (f) The order of the conditions in an if-elif-else block does not matter.

   (g) The elif statement can be used multiple times within an if-elif-else block.

   (h) The "not" operator is used to reverse the logical state of its operand.

   (i) Nested if statements are if statements that are placed inside each other, allowing for multiple levels of conditional execution.

   (j) The elif statement requires also using an if statement and an else statement.

   (k) The else statement can be used without an if statement.

   (l) The = operator is used to compare two values for equality, while the == operator is used to assign a value to a variable.

a	b	c	d	e	f	g	h	i	j	k	l
T	F	T	F	F	F	T	T	T	F	F	F

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Questions 2-11 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. Can a variable declared within an if statement be accessed outside of that if statement?

   A. Yes, it can.
   B. No, it cannot.
   C. It depends on whether the declaration executes.
   D. Only if the variable is defined as global.

3. What is the result of the logical operation `True and False`?

   A. True B. False C. None D. Error

4. Which logical operator in Python returns True if at least one of the operands is True?

   A. `and` B. `or` C. `not` D. `is`

5. When would you typically use a conditional expression in Python?

   A. When you need to execute a block of code repeatedly.
   B. When you need to iterate over a known sequence of elements.
   C. When you need to assign a value based on a condition.
   D. When you want to handle errors and exceptions.

6. What happens if none of the conditions in an if-elif-else block are met?

   A. The program terminates.
   B. The block of code associated with the else statement is executed.
   C. The program moves to the next line of code outside the if-elif-else block.
   D. An error is raised.

7. When would you typically use an `elif` statement instead of multiple `if` statements?

   A. When you want to provide a default block of code to execute when none of the previous conditions are met.
   B. When you have multiple conditions to check, but only one of them should be executed.
   C. When you need to execute a block of code repeatedly.
   D. When you want to handle specific cases within a larger set of conditions.

8. Consider the expression `x >= 0 or y < 10`. If we assume x is equal to 10, and y is equal to 5, then Python will evaluate... (hint: think of short-circuit evaluation)

   A. Python will evaluate both conditions in left-right order to determine whether the expression is True.

   B. Python will evaluate both conditions in right-left order to determine whether the expression is True.

   C. Python will evaluate only the second condition, `y < 10`.

   D. Python will evaluate only the first condition, `x >= 0`.

9. Which of the following statements is true?

   A. `(x >= 5 and x < 15)` is the same as `(5 <= x < 15)`

   B. `(y > 0 or y < -10)` is the same as `y > 0 and y < -10`

   C. `(x > 0 or x < -5 and y < 0)` is the same as
   `((x > 0 or x < -5) and y < 0)` the parentheses make a difference in C!

   D. A and C are both true

10. Which of the following is equivalent to the expression
    `(p + q > r) and (s - t <= u)`?

    A. `(p + q > r) and not (s - t >= u)`

    B. `not (p + q < r) and (s - t <= u)`

    C. `(p - q <= r) and (t - s > u)`

    D. `not ((p + q <= r) or (s - t > u))`

    Note that if we want the *opposite* of (s - t <= u), then we'd do : (s - t > u). Because the opposite of <= is >. So, not (s- t > u) would be equivalent to (s - t <= u), because (s - t > u) is the opposite, but we 'not' it. Same with (p + q > r) and not (p + q <= r).

11. What does the expression `5 + 10 * 2 // 3 - 4` evaluate to?

    A. 6 B. 7 C. 8 D. 9

2	3	4	5	6	7	8	9	10	11
C	B	B	C	B	B	D	A	D	B

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The following 6 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.

12. (3 points)

```
x = 10
y = 3

z = (x ** 2) % y + x // y + y
print(z)
```

PEMDAS!

7

13. (3 points)

Let’s work this out:

not ((x + y) == (x * y) and (x % y) == (y // x))
not ((8) == (15) and (3) == (1))
not (False and False)
not False
True

```
x = 3
y = 5

z = not ((x + y) == (x * y) and (x % y) == (y // x))
print(z)
```

True

14. (3 points)

result = 5 and (5 + 10 * 2 == 30) and (5 != True)
result = 5 and (5 + 20 == 30) and (5 != True)
result = 5 and False and True
result = False

```
x = 5
y = 10
z = 2

result = x and (x + y * z == 30) and (5 != True)
print(result)
```

remember PEMDAS =)

False

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I LOVE cows! So cute!

15. (3 points)

```
moomoo = None

if moomoo == None and (bool(0.0) != bool(0)):
    print("cow")
elif not moomoo or (moomoo == "None" and bool("lactoseIntolerant")):
    print("milky")
else:
    print("udder")
```

bool(0.0) and bool(0) are the same (both False).
So, bool(0.0) != bool(0) will be False.
Thus, the ‘if’ does not trigger.

not moomoo will be not None, which evaluates to True. Because this elif uses ‘or’, we only need one True condition, so it triggers and prints milky.

milky

16. (3 points)

```
snoopy, pluto, scooby = 6, 10, 0

if snoopy == pluto or not scooby:
    scooby = 1
elif pluto > snoopy and not scooby:
    scooby = 2

if scooby == True:
    print("Coco")
else:
    print("Charro")
```

scooby is == 0. So, not scooby is not 0, which will evaluate to True in a boolean context. Because the first if is ‘or’, and has ‘not scooby’, which is True, the first if triggers.

so, scooby is 1. scooby == True, now, will be 1 == True. Which is True!

note that if scooby was 2, 2 == True would be False. Same with any other number, other than 1. Don’t think you /need/ to know this, just kind of cool.

Coco

17. (3 points)

```
cutie, patootie, silly = 5, 6, -1

if (cutie == 5):
    silly += 3
elif (patootie == 6):
    silly = 4
if (patootie > 0):
    silly -= 1
if (cutie  < 999):
    silly + 1
print(silly)
```

For this question, we wanted you to think about which statements would and would not trigger. cutie == 5 so the first one triggers. But even though patootie == 6, /because/ the second statement is an elif, it is mutually exclusive with the first statement. So, since the first triggers, the second cannot.

The third one triggers (silly -= 1), and so does the fourth. But note that the fourth does *not* reassign a value to silly.

So, silly (-1) gets + 3 from the first statement, and -1 from the third. -1 + 3 - 1 = 1.

1

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This worksheet is HARD!!!! Good practice for the exam though =)