Python Programming in Context 3rd edition Miller Test Bank

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Python Programming in Context 3E
Ch. 02
Test Bank
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Multiple Choice

1. In order to use the `sqrt()` function, you must use which of the following Python statements?
A) `use math;`
B) `import math;`
C) `math::sqrt();`
D) `return sqrt();`
Ans: B
Ahead: 2.2
Subject: Ch 2
Complexity: Easy

2. Which of the following is a constant in the `math` module?
A) `sqrt`
B) `tan`
C) `asin`
D) `e`
Ans: D
Ahead: 2.3
Subject: Ch 2
Complexity: Moderate

3. What equation relates pi to the circumference of a circle?
A) `C = 2πr` (where `r` is the radius of the circle)
B) `C = πr` (where `r` is the radius of the circle)
C) `C = 2πd` (where `d` is the diameter of the circle)
D) `C = 2πa` (where `a` is the area of the circle)
Ans: A
Ahead: 2.4
Subject: Ch 2
Complexity: Easy

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Reference: Case Study 1

```
>>> import math
>>> numSides = 8
>>> innerAngleB = 360.0 / numSides
>>> halfAngleA = innerAngleB / 2
>>> oneHalfSideS = math.sin(math.radians(halfAngleA))
>>> sideS = oneHalfSideS * 2
>>> polygonCircumference = numSides * sideS
>>> pi = polygonCircumference / 2
>>> pi
3.0614674589207183
```

4. Refer to the session in the accompanying case study. Which line uses the math module?
A) `innerAngleB = 360.0 / numSides`
B) `oneHalfSideS = math.sin(math.radians(halfAngleA))`
C) `pi = polygonCircumference / 2`
D) `sideS = oneHalfsideS * 2`
Ans: B
Ahead: 2.4.1
Subject: Ch 2
Complexity: Easy

5. Refer to the session in the accompanying case study. How many sides does the polygon in this approximation have?
A) `2`
B) `8`
C) `64`
D) `pi`
Ans: B
Ahead: 2.4.1
Subject: Ch 2
Complexity: Easy

6. The ____ statement is used to terminate a function.
A) `return`
B) `exit`
C) `end`

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D) `quit`
Ans: A
Ahead: 2.4.2
Subject: Ch 2
Complexity: Easy

7. How many times will the following print statement be executed?

```
>>> for sides in range(8, 100, 8):
     print(sides, archimedes(sides))
```

A) `1`
B) `8`
C) `12`
D) `16`
Ans: C
Ahead: 2.4.2
Subject: Ch 2
Complexity: Moderate

Reference: Case Study 2

```
>>> acc = 0
>>> for x in range(1, 6):
     acc = acc + x
>>> acc
15
```

8. Refer to the session in the accompanying case study. Which of the following is the initialization statement?
A) `acc`
B) `for x in range(1, 6):`
C) `acc = acc + x`
D) `acc = 0`
Ans: D
Ahead: 2.5
Subject: Ch 2
Complexity: Moderate

9. Refer to the session in the accompanying case study. What type of variable is `acc`?

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A) Accumulator variable
B) Range variable
C) Initialization variable
D) Timer variable
Ans: A
Ahead: 2.5
Subject: Ch 2
Complexity: Easy

10. What is the name of the formula that calculates pi using the following equation?
$\Pi/4 = 1/1 - 1/3 + 1/5 - 1/7 + 1/9 \ldots$
A) Archimedes approach
B) Leibniz formula
C) Wallis formula
D) Monte Carlo simulation
Ans: B
Ahead: 2.5,2
Subject: Ch 2
Complexity: Easy

11. When calculating pi using the Wallis formula, the accumulator variable:
A) must be initialized to zero.
B) is increased by two each iteration.
C) must be initialized to one.
D) is multiplied by two each iteration.
Ans: C
Ahead: 2.5.3
Subject: Ch 2
Complexity: Moderate

12. The ____ uses probability and random behavior to calculate pi.
A) Archimedes approach
B) Leibniz formula
C) Wallis formula
D) Monte Carlo simulation
Ans: D
Ahead: 2.6
Subject: Ch 2
Complexity: Easy

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13. To create a random number in Python, use the ____ function.
A) `math.random()`
B) `random.random()`
C) `montecarlo.random()`
D) `help.random()`
Ans: B
Ahead: 2.6
Subject: Ch 2
Complexity: Moderate

14. The relational operator that means "not equal" is represented with which operator in Python?
A) ==
B) `!=`
C) <=
D) >=
Ans: B
Ahead: 2.6.1
Subject: Ch 2
Complexity: Easy

Reference: Case Study 3

```
1. if <condition>:
2.    if <condition>:
3.          <statements>
4.    else:
5.          <statements>
6. else:
7.    if <condition>:
8.          <statements>
9.    else:
10.         <statements>
```

15. Refer to the code in the accompanying case study. Under what circumstances are the statements on line 10 executed?
A) The condition in line 1 is `false`, and the condition in line 7 is `false`.
B) The condition in line 1 is `false`, and the condition in line 7 is `true`.
C) The condition in line 1 is `true`, and the condition in line 7 is `false`.

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D) The condition in line 1 is `true`, and the condition in line 7 is `true`.
Ans: A
Ahead: 2.6.3
Subject: Ch 2
Complexity: Moderate

True or False

1. The parameters passed to the *print* function are, by default, separated by a space when printed.
Ans: True
Ahead: 2.4.2
Subject: Ch 2
Complexity: Easy

2. The code in the accompanying case study 2 (see below) is used to calculate a running product.

```
>>> acc = 0
>>> for x in range(1, 6):
     acc = acc + x
>>> acc
15
```

Ans: False. The code uses a running sum. It is using an accumulator.
Ahead: 2.2.5
Subject: Ch 2
Complexity: Easy

3. When using the Wallis function, the larger the value of the parameter passed into the function, the less accurate the result. Therefore, `wallis(100)` will be more accurate than `wallis(10000)`.
Ans: False. The larger the value, the more accurate the result.
Ahead: 2.5.3
Subject: Ch 2
Complexity: Easy

4. Another name for an `if` statement is a selection statement.

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Ans: True
Ahead: 2.6.3
Subject: Ch 2
Complexity: Easy

5. To create a drawing window, use the `Screen` constructor contained in the `turtle` module.
Ans: True
Ahead: 2.6.5
Subject: Ch 2
Complexity: Easy

Matching

1. Match each term with its definition.
1. True or False
Ans: Boolean values
2. Contains a question and other groups of statements that may or may not be executed, depending on the result of the question.
Ans: Selection statement
3. `and`, `or`, and `not`
Ans: Logical operators
4. Compares two data values.
Ans: Relational expressions
Ahead: 2.6.1, 2.6.2
Subject: Ch 2
Complexity: Moderate

Short Answer

1. Refer to the session in the accompanying Case Study 1. Explain, in general terms, how to modify this series of statements in such a way that you would be able to change the number of sides and try the calculation again without needing to retype all of the statements.
Ans: One way to accomplish this is to use abstraction. Abstraction allows us to think about a collection of steps as a logical group. In Python, we can define a function that not only serves as a name for a sequence of actions but also returns a value when it is called. We have already seen this type of behavior with the `sqrt` function. When we call `sqrt(16)`, it returns `4`.

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Ahead: 2.4.2
Subject: Ch 2
Complexity: Moderate

2. Refer to the session in the accompanying Case Study 2. Explain what pattern this code implements and why it is useful.
Ans: The code implements a common problem-solving pattern known as the accumulator pattern. This common pattern comes up often. Your ability to recognize the pattern and then implement it will be especially useful as you encounter new problems that need to be solved. As an example, consider the simple problem of computing the sum of the first five integer numbers. Of course, this is quite easy because we can just evaluate the expression 1+2+3+4+5. But what if we wanted to sum the first ten integers? Or perhaps the first hundred? In this case, we would find that the size of the expression would become quite long. To remedy this, we can develop a more general solution that uses iteration.
Ahead: 2.5.1
Subject: Ch 2
Complexity: Moderate

3. What are some patterns to keep in mind when implementing the Leibniz formula with Python?
Ans:

- All the numerators are 4.
- The denominators are all odd numbers.
- The sequence alternates between addition and subtraction.

Ahead: 2.5.2
Subject: Ch 2
Complexity: Easy

4. Explain how a Monte Carlo simulation can be used to calculate the value of pi.
Ans: Pretend that we are looking at a dartboard in the shape of a square that is 2 units wide and 2 units high. A circle has been inscribed within the square so that the radius of the circle is 1 unit. Now assume that we cut out the upper right-hand quadrant of the square. The result will be a square that is 1 unit high and 1 unit wide with a quarter-circle transcribed inside. This piece is what we will use to "play" our simulation. The area of the original square was 4 units. The area of the original circle was $\pi r2 = \pi$ units since the circle had a radius of 1 unit. After we cut the upper-right quarter, the area of the quarter-circle is $\pi/4$ and the area of the entire quarter square is 1.

The simulation will work by randomly "throwing darts" at the dartboard. We will assume that every dart will hit the board but that the location of that strike will be random. It is easy to see that each dart will hit the square, but some will also land inside the quarter-circle. The number of

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darts that hit inside or outside the quarter-circle will be proportional to the areas of each. More specifically, the fraction of darts that land inside the quarter-circle will be equal to π/4.
Ahead: 2.6
Subject: Ch 2
Complexity: Moderate

5. Explain the difference between the "=" in line 1 and the "==" in line 2 in the code sample below:

```
1. >>> apple = 25
2. >>> apple == 25
3. True
```

Ans: On line 1, the variable apple is assigned the value 25 and is then used in an equality comparison in line 2. It is important to distinguish between the use of the assignment operator, =, and the equality operator, ==.
Ahead: 2.6.1
Subject: Ch 2
Complexity: Moderate

6. Explain the term short-circuit evaluation of Boolean expressions. Use an example to illustrate what this means.
Ans: This means that Python evaluates only as much of the expression, from left to right, as it needs to in order to determine if the expression is `True` or `False`. For example, consider the Boolean expression `3 < 7 or 10 < 20`. Because `3 < 7` is `True`, we know at that time that the full expression is `True`. Python does not need to evaluate the expression `10 < 20` since it would not matter whether `10 < 20` is `True` or `False`. Similarly, for the Boolean expression `10 > 20` and `3 < 7`, Python would need to evaluate only the `10 > 20` part of the expression. Because `10 > 20` is `False`, the full expression will be `False` regardless of whether `3 < 7` is `True` or `False`.
Ahead: 2.6.2
Subject: Ch 2
Complexity: Difficult

7. Why are decisions referred to as "selection" in computer science?
Ans: In computer science, decisions are often referred to as "selection" because we wish to select between possible outcomes based on the result of the question we have asked. For example, when we go outside in the morning, we might ask the question "Is it raining?" If it is raining, we will grab an umbrella. Otherwise, we will pack our sunglasses. We are selecting which item to take with us based on the condition of the weather.
Ahead: 2.6.3
Subject: Ch 2

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Complexity: Easy

8. Refer to the code in the accompanying Case study 3. Why is this section of code referred to as "nested selection"?
Ans: The result of this structure is to decide between four groups of statements. If the outer condition is `True`, then the first nested `ifelse` is performed. If the nested condition is also `True`, then the first group of statements is performed. However, if the nested condition is `False`, the second group of statements is executed. Likewise, if the outer condition is `False`, the second nested `ifelse` will be performed. In this way, we are able to decide between four groups of statements by using the results of two conditions.
Ahead: 2.6.3
Subject: Ch 2
Complexity: Moderate

9. Explain how to modify the coordinate system of the drawing window when using the `turtle` module.
Ans: To modify the coordinate system of the drawing window, we can use a `Screen` method called `setworldcoordinates`. This method will take four pieces of information: (1) the x -coordinate of the lower-left corner, (2) the y-coordinate of the lower-left corner, (3) the x -coordinate of the upper-right corner, and (4) the y-coordinate of the upper-right corner. These two points will denote the coordinates of the lower-left and upper-right corners of the window used by the drawing turtle: `wn.setworldcoordinates(-2, -2, 2, 2)`.
Ahead: 2.6.5
Subject: Ch 2
Complexity: Moderate

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