Exam 4

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Questions

1 What is a class in object-oriented programming (select one)?

Answer: A

2 Given the Python class below, complete the tasks that follow the code snippet:Given the Python class below, complete the tasks that follow the code snippet:

```
[ ]: class Vehicle:
         vehicle_count = 0 # Task a: Comment this line to explain what it does.

         def __init__(self, brand, model):
             self.__brand = brand # Task b: Explain why '__' is used before 'brand'.
             self.__model = model
             Vehicle._______ += 1 # Task c: Fill in the blank for the class variable.

     def display_info(self):
         print(f"Brand: {self.__brand}, Model: {self.__model}")

         @_________ # Task d: Fill in the blank to define a method that doesn't␣
       ↪alter the class or its instances.

     def get_vehicle_count():
         return Vehicle.vehicle_count # Task e: Comment about what it returns.
```

a) This line declares a variable called “vehicle_count” and assigns it the value 0.

b) When the python interpreter sees “___” it knows that the value of the variable after it is private. Private meaning the value can not be accessed from outside the class object itself.

c) Vehicle.vehicle_count

d) @staticmethod

e) Depending on how many vehicle objects are made it will return that value, if n vehicle objects exist n will be returned.

3 Coding problem

Create a Python class named Grades that computes the course grades. Write the code to produce an output like the example provided. Ensure you also display the results, not just the code. BONUS: Add additional code in the Grades class to convert to a letter grade. Show the output results.

[ ]:
```
class Grades:
    def __init__(self, hwWeight, examWeight, partWeight, labWeight):
        self.hwWeight = hwWeight
        self.examWeight = examWeight
        self.partWeight = partWeight
        self.labWeight = labWeight
        self.classPart = 100
        self.hwScores = []
        self.examScores = []
        self.labPoints = 0

    def addHomework(self, hwScores):
        self.hwScores = hwScores

    def addExams(self, examScores):
        self.examScores = examScores

    def setLabs(self, numOfLabs):
        if numOfLabs >= 6:
            self.labPoints = 100
        else:
            self.labPoints = (100 / 6) * numOfLabs

    def calculateAverage(self, scores):
        return sum(scores) / len(scores)

    def calculateFinalGrade(self):
        hwAverage = self.calculateAverage(self.hwScores)
        examAverage = self.calculateAverage(self.examScores)

        hwGrade = hwAverage * self.hwWeight
        examGrade = examAverage * self.examWeight
        labGrade = self.labPoints * self.labWeight
        partGrade = self.classPart * self.partWeight

        finalGrade = hwGrade + examGrade + labGrade + partGrade
```

```python
        return finalGrade

    def convertToLetterGrade(self, finalGrade):
        if finalGrade >= 97:
            return 'A+'
        elif finalGrade >= 93:
            return 'A'
        elif finalGrade >= 90:
            return 'A-'
        elif finalGrade >= 87:
            return 'B+'
        elif finalGrade >= 83:
            return 'B'
        elif finalGrade >= 80:
            return 'B-'
        elif finalGrade >= 77:
            return 'C+'
        elif finalGrade >= 73:
            return 'C'
        elif finalGrade >= 70:
            return 'C-'
        elif finalGrade >= 67:
            return 'D+'
        elif finalGrade >= 63:
            return 'D'
        elif finalGrade >= 60:
            return 'D-'
        else:
            return 'F'

    def report(self):
        def border():
            print('-' * 45)

        border()
        print('GRADE REPORT')
        border()

        print('1. Homework Points')
        for i, score in enumerate(self.hwScores):
            print(f'Homework {i + 1} {score}')
        hwTotal = sum(self.hwScores)
        hwNum = len(self.hwScores)
        hwAverage = self.calculateAverage(self.hwScores)
        print(f'Total = {hwTotal}, Num = {hwNum}, Average = {hwAverage:.2f}')
        border()
        print('2. Exams Points')
        for i, score in enumerate(self.examScores):
            print(f'Exam {i + 1} {score}')
        examTotal = sum(self.examScores)
        examNum = len(self.examScores)
        examAverage = self.calculateAverage(self.examScores)
        print(f'Total = {examTotal}, Num = {examNum}, Average = {examAverage:.
 ↪2f}')
        border()

        print(f'3. Lab sessions = {self.labPoints / (100 / 6)}, Points = {self.
 ↪labPoints:.2f}')
        border()

        print(f'4. Class Participation Points = {self.classPart}')

        border()
        print('SUMMARY')
        border()

        hwGrade = hwAverage * self.hwWeight
        examGrade = examAverage * self.examWeight
        labGrade = self.labPoints * self.labWeight
        partGrade = self.classPart * self.partWeight
        finalGrade = hwGrade + examGrade + labGrade + partGrade
        print(f'Homework {hwAverage:.2f} x {self.hwWeight*100:.0f}% = {hwGrade:.
 ↪2f}')
        print(f'Exams {examAverage:.2f} x {self.examWeight*100:.0f}% =␣
 ↪{examGrade:.2f}')
        print(f'Labs {self.labPoints:.2f} x {self.labWeight*100:.0f}% =␣
 ↪{labGrade:.2f}')
        print(f'Participation {self.classPart:.2f} x {self.partWeight*100:.0f}%␣
 ↪= {partGrade:.2f}')
        print(f'Final Grade Points {finalGrade:.2f}')

        border()
        letterGrade = self.convertToLetterGrade(finalGrade)
        print(f'Final Grade Letter {letterGrade}')
        border()


grade = Grades(0.4, 0.5, 0.05, 0.05)
grade.addHomework([100, 110, 90, 100, 110, 90, 86])
grade.addExams([70, 100, 80, 105])
grade.setLabs(3)
grade.report()
```

```
---------------------------------------------
GRADE REPORT
---------------------------------------------
1. Homework Points
Homework 1 100
Homework 2 110
Homework 3 90
Homework 4 100
Homework 5 110
Homework 6 90
Homework 7 86
Total = 686, Num = 7, Average = 98.00
---------------------------------------------
2. Exams Points
Exam 1 70
Exam 2 100
Exam 3 80
Exam 4 105
Total = 355, Num = 4, Average = 88.75
---------------------------------------------
3. Lab sessions = 3.0, Points = 50.00
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4. Class Participation Points = 100
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SUMMARY
---------------------------------------------
Homework 98.00 x 40% = 39.20
Exams 88.75 x 50% = 44.38
Labs 50.00 x 5% = 2.50
Participation 100.00 x 5% = 5.00
Final Grade Points 91.08
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Final Grade Letter A-
---------------------------------------------
```