

BRAC UNIVERSITY

Department of Computer Science and Engineering

Examination: Midterm

Duration: 60 Minutes

No. of Questions: 3

CSE 111: Programming Language II

Semester: Spring 2023

Full Marks: 20

No. of Pages: 2

Name: (Please write in CAPITAL LETTERS)	ID:	Section:
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B

✓ Use the back **part** of the answer script for rough work. **No washroom breaks.**

✓ At the end of the exam, put the question **paper** inside the answer script and **return both.**

Question 1: CO2 [4 Points]

Design the “CoffeeMachine” class with required properties to produce the given output for the provided driver code.

#Write your code here

```
cm1 = CoffeeMachine("Miyako")
cm1.insertIngredients("Coffee beans", "Milk", "Sugar")
print(cm1.getDetails())
```

Output:

Brand Name: Miyako
Ingredients: Coffee beans, Milk, Sugar

Question 2: CO4 [6 Points]

1	<code>class MidB:</code>
2	<code> def __init__(self):</code>
3	<code> self.y, self.z, self.sum = 3, 2, -1</code>
4	<code> def m1(self, mg2, mg1=2):</code>
5	<code> x = 0</code>
6	<code> self.y = self.y + mg2[0]</code>
7	<code> x += 23 + mg1</code>
8	<code> self.sum += x + self.y</code>
9	<code> mg2[0] = self.y + mg1</code>
10	<code> mg1 = mg1 + x + 4</code>
11	<code> print(x, self.y, self.sum)</code>
12	<code> def m2(self, y=3):</code>
13	<code> mid = [0]</code>
14	<code> mid[0] = 5</code>
15	<code> self.m1(mid, mid[0])</code>
16	<code> z = y + mid[0]</code>
17	<code> y = self.y + mid[0]</code>
18	<code> self.sum = z + y + mid[0]</code>
19	<code> print(z, y, self.sum)</code>

Illustrate the output of the following statements:

`a = MidB()`

`a.m1([8])`

`a.m2()`

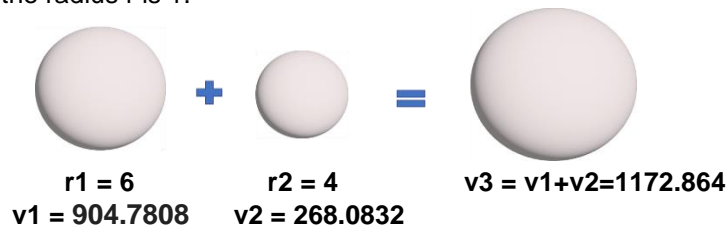
Output
[Answer on question paper]

		79
24		82

Question 3: CO2, CO4 [10 Points]

Design the **Sphere** class such that the following output is produced. **Hints:**

1. Volume of the sphere = $\frac{4}{3} * \pi * r^3$, where r = radius of the sphere and $\pi = 3.1416$.
2. Merging spheres together conserves the total volume. The volume of the bigger sphere can be calculated by adding the volume of the spheres being merged. [see pictures for details]. Pay attention to how the object is updated.
3. When spheres of different colors are merged together then the merged sphere will have '**Mixed Color**' instead of one particular color.
4. Your code should work for any number of Sphere objects passed to the **merge_sphere()** method.
5. You do not need to worry about how many digits should be printed after the decimal point.
6. The default value of the radius r is 1.



#Write your code here

```
sphere1 = Sphere("Sphere 1")
print("1*****")
sphere1.printDetails()
print("2*****")
sphere2 = Sphere("Sphere 2", 3)
print("3*****")
sphere2.printDetails()
print("4*****")
sphere3 = Sphere("Sphere 3", 2)
print("5*****")
sphere3.printDetails()
print("6*****")
sphere3.merge_sphere(sphere1,sphere2)
print("7*****")
sphere3.printDetails()
print("8*****")
sphere4 = Sphere("Sphere 4", 5, "Purple")
print("9*****")
sphere4.merge_sphere(sphere3)
print("10*****")
sphere4.printDetails()
```

Output:

```
1*****
Sphere ID: Sphere 1
Color: White
Volume: 4.1888
2*****
3*****
Sphere ID: Sphere 2
Color: White
Volume: 113.09759999999999
4*****
5*****
Sphere ID: Sphere 3
Color: White
Volume: 33.5104
6*****
Spheres are being merged
7*****
Sphere ID: Sphere 3
Color: White
Volume: 150.7968
8*****
9*****
Spheres are being merged
10*****
Sphere ID: Sphere 4
Color: Mixed Color
Volume: 674.3967999999999
```