

| **Course Code:** | **CSE111** |
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| **Course Title:** | **Programming Language II** |
| **Classwork No:** | **06** |
| **Topic:** | **OOP (HAS-A relationship)** |
| **Number of tasks:** | **4** |

**Task 1**

Design the program to get the output as shown.

**[You are not allowed to change the code below]**

| ***# Write your code here***    t1 = Teacher("Saad Abdullah", "CSE")  t2 = Teacher("Mumit Khan", "CSE")  t3 = Teacher("Sadia Kazi", "CSE")  c1 = Course("CSE 110 Programming Language I")  c2 = Course("CSE 111 Programming Language-II")  c3 = Course("CSE 220 Data Structures")  c4 = Course("CSE 221 Algorithms")  c5 = Course("CSE 230 Discrete Mathematics")  c6 = Course("CSE 310 Object Oriented Programming")  c7 = Course("CSE 320 Data Communications")  c8 = Course("CSE 340 Computer Architecture")  t1.addCourse(c1)  t1.addCourse(c2)  t2.addCourse(c3)  t2.addCourse(c4)  t2.addCourse(c5)  t3.addCourse(c6)  t3.addCourse(c7)  t3.addCourse(c8)  t1.printDetail()  t2.printDetail()  t3.printDetail() | **Output:**  ====================================  Name: Saad Abdullah  Department: CSE  List of courses  ====================================  CSE 110 Programming Language I  CSE 111 Programming Language-II  ====================================  ====================================  Name: Mumit Khan  Department: CSE  List of courses  ====================================  CSE 220 Data Structures  CSE 221 Algorithms  CSE 230 Discrete Mathematics  ====================================  ====================================  Name: Sadia Kazi  Department: CSE  List of courses  ====================================  CSE 310 Object Oriented Programming  CSE 320 Data Communications  CSE 340 Computer Architecture  ==================================== |
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**Task 2**

Please write the **Student** and **Department** class with the necessary properties so that the provided driver code generates the output given below.

| **Driver Code** | **Output** |
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| **s1 = Student("Akib", 22301010, 3.29)**  **s2 = Student("Reza", 22101010, 3.45)**  **s3 = Student("Ruhan", 23101934, 4.00)**  **print("1==================================")**  **cse = Department("CSE")**  **cse.findStudent(22112233)**  **print("2==================================")**  **cse.addStudent(s1,s2,s3)**  **print("3==================================")**  **cse.details()**  **print("4==================================")**  **cse.findStudent(22301010)**  **print("5==================================")**  **s4 = Student("Nakib",22301010,3.22)**  **cse.addStudent(s4)**  **print("6==================================")**  **s4.setId(21201220)**  **cse.addStudent(s4)**  **print("7==================================")**  **cse.details()**  **print("8==================================")**  **s5 = Student("Sakib",22201010,2.29)**  **cse.addStudent(s5)**  **print("9==================================")**  **cse.details()** | 1=======================================  Student with this ID doesn't exist, Please give a valid ID  2=======================================  Welcome to CSE department, Akib  Welcome to CSE department, Reza  Welcome to CSE department, Ruhan  3=======================================  Department Name: CSE  Number of student:3  Details of the students:  Student name: Akib, ID: 22301010, cgpa: 3.29  Student name: Reza, ID: 22101010, cgpa: 3.45  Student name: Ruhan, ID: 23101934, cgpa: 4.0  4=======================================  Student info:  Student Name: Akib  ID: 22301010  CGPA: 3.29  5=======================================  Student with the same ID already exists, Please try with another ID  6==================================  Welcome to CSE department, Nakib  7=======================================  Department Name: CSE  Number of student:4  Details of the students:  Student name: Akib, ID: 22301010, cgpa: 3.29  Student name: Reza, ID: 22101010, cgpa: 3.45  Student name: Ruhan, ID: 23101934, cgpa: 4.0  Student name: Nakib, ID: 21201220, cgpa: 3.22  8=======================================  Welcome to CSE department, Sakib  9=======================================  Department Name: CSE  Number of student:5  Details of the students:  Student name: Akib, ID: 22301010, cgpa: 3.29  Student name: Reza, ID: 22101010, cgpa: 3.45  Student name: Ruhan, ID: 23101934, cgpa: 4.0  Student name: Nakib, ID: 21201220, cgpa: 3.22  Student name: Sakib, ID: 22201010, cgpa: 2.29 |

**Task 3**

Design the **Vaccine** and **Person** class so that the following expected output is generated.

**[**N.B: Students will get vaccines on a priority basis. So, age for students doesn’t matter**]**

| **Driver Code** | **Output** |
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| ***# Write your code here***  astra = Vaccine("AstraZeneca", "UK", 60)  modr = Vaccine("Moderna", "UK", 30)  sin = Vaccine("Sinopharm", "China", 30)  p1 = Person("Bob", 21, "Student")  print("=================================")  p1.pushVaccine(astra)  print("=================================")  p1.showDetail()  print("=================================")  p1.pushVaccine(sin, "2nd Dose")  print("=================================")  p1.pushVaccine(astra, "2nd Dose")  print("=================================")  p1.showDetail()  print("=================================")  p2 = Person("Carol", 23, "Actor")  print("=================================")  p2.pushVaccine(sin)  print("=================================")  p3 = Person("David", 34)  print("=================================")  p3.pushVaccine(modr)  print("=================================")  p3.showDetail()  print("=================================")  p3.pushVaccine(modr, "2nd Dose") | =================================  1st dose done for Bob  =================================  Name: Bob Age: 21 Type: Student  Vaccine name: AstraZeneca  1st dose: Given  2nd dose: Please come after 60 days  =================================  Sorry Bob, you can’t take 2 different vaccines  =================================  2nd dose done for Bob  =================================  Name: Bob Age: 21 Type: Student  Vaccine name: AstraZeneca  1st dose: Given  2nd dose: Given  =================================  =================================  Sorry Carol, Minimum age for taking vaccines is 25 years now.  =================================  =================================  1st dose done for David  =================================  Name: David Age: 34 Type: General Citizen  Vaccine name: Moderna  1st dose: Given  2nd dose: Please come after 30 days  =================================  2nd dose done for David |

**Task 4**

| **1** | **class msgClass:** |
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| **2** | **def \_\_init\_\_(self):** |
| **3** | **self.content = 0** |
| **4** | **class Q5:** |
| **5** | **def \_\_init\_\_(self):** |
| **6** | **self.sum = 1** |
| **7** | **self.x = 2** |
| **8** | **self.y = 3** |
| **9** | **def methodA(self):** |
| **10** | **x, y = 1, 1** |
| **11** | **msg = []** |
| **12** | **myMsg = msgClass()** |
| **13** | **myMsg.content = self.x** |
| **14** | **msg.append(myMsg)** |
| **15** | **msg[0].content = self.y + myMsg.content** |
| **16** | **self.y = self.y + self.methodB(msg[0])** |
| **17** | **y = self.methodB(msg[0]) + self.y** |
| **18** | **x = y + self.methodB(msg[0], msg)** |
| **19** | **self.sum = x + y + msg[0].content** |
| **20** | **print(x," ", y," ", self.sum)** |
| **21** | **def methodB(self, mg1, mg2 = None):** |
| **22** | **if mg2 == None:** |
| **23** | **x, y = 5, 6** |
| **24** | **y = self.sum + mg1.content** |
| **25** | **self.y = y + mg1.content** |
| **26** | **x = self.x + 7 +mg1.content** |
| **27** | **self.sum = self.sum + x + y** |
| **28** | **self.x = mg1.content + x +8** |
| **29** | **print(x, " ", y," ", self.sum)** |
| **30** | **return y** |
| **31** | **else:** |
| **32** | **x = 1** |
| **33** | **self.y += mg2[0].content** |
| **34** | **mg2[0].content = self.y + mg1.content** |
| **35** | **x = x + 4 + mg1.content** |
| **36** | **self.sum += x + self.y** |
| **37** | **mg1.content = self.sum - mg2[0].content** |
| **38** | **print(self.x, " ",self.y," ", self.sum)** |
| **39** | **return self.sum** |

| **What is the output of the following code sequence?**  **q = Q5()**  **q.methodA()** | **x** | **y** | **sum** |
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