

# AIN SHAMS UNIVERSITY FACULTY OF ENGINEERING

i-CREDIT HOURS ENGINEERING PROGRAMS

COMPUTER ENGINEERING & SOFTWARE SYSTEMS PROGRAM

AUTOMATION AND MECHATRONICS PROGRAM



Fall Semester 2021

Course Code: CSE231 – CSE228

Time allowed: 2 Hrs.

## Advanced Computer Programming

The Exam Consists of Three Questions in Four Pages.

Maximum Marks: 40 Marks

1 / 2

تعليمات هامة

- حيازة التليفون المحمول مفتوحا داخل لجنة الامتحان يعتبر حالة غش تستوجب العقاب وإذا كان ضروري الدخول بالمحمول فيوضع مغلق في الحقائب.
- لا يسمح بدخول سماعة الأذن أو البلوتوث.
- لا يسمح بدخول أي كتب أو ملازم أو أوراق داخل اللجنة والمخالفة تعتبر حالة غش.

### Question (1): [5 marks]

Choose the correct answer (Only one. No credit otherwise)

- \_\_\_\_\_ is invoked to create an object.
 

A) A constructor	B) The mail method
C) A method with a return type	D) A method with the void return type
- Object Oriented inheritance models \_\_\_\_\_ relation.
 

A) "is – a "	B) "wants to be"
C) "has – a "	D) none of the mentioned
- Which of the following is a correct definition of interface A?
 

A) interface A { void print() { }; }	B) abstract interface A { print(); }
C) abstract interface A { abstract void print() { }; }	D) interface A { void print(); }
- Which of the following declares an abstract method in an abstract Java class?
 

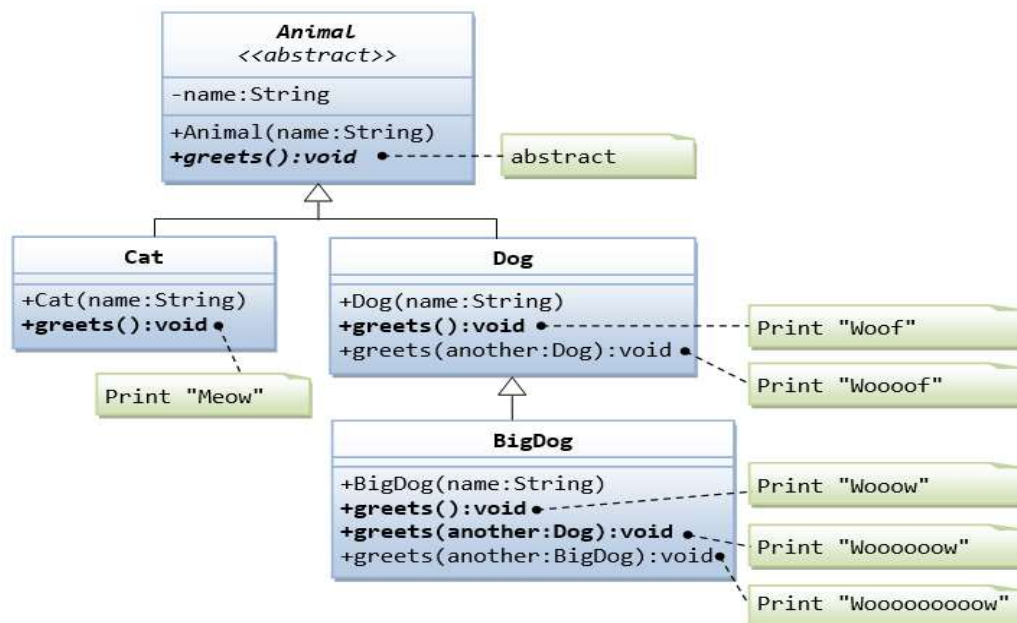
A) public abstract method();	B) public abstract void method();
C) public void abstract method();	D) public abstract void method() { }
- A JavaFX action event handler contains a method \_\_\_\_\_.
 

A) public void actionPerformed(ActionEvent e)	B) public void actionPerformed(Event e)
C) public void handle(ActionEvent e)	D) public void handle(Event e)

### Question (2): [25 marks]

- Implement the classes shown in the given UML diagram:

[10 Marks]



- Referring to the diagram in a) and the implementation you written, write the outputs (or errors) for the following test program [11 Marks]  
Please write the line number and the expected output/error for lines (5, 7, 9, 12, 14, 16, 17, 23, 24, 25, 26, 27).

<pre> 1. public class TestAnimal { 2.     public static void main(String[] args) { 3.         // Using the subclasses 4.         Cat cat1 = new Cat("C"); 5.         cat1.greets(); 6.         Dog dog1 = new Dog("D"); 7.         dog1.greets(); 8.         BigDog bigDog1 = new BigDog("Big"); 9.         bigDog1.greets(); 10.        // Using Polymorphism 11.        Animal animal1 = new Cat("C"); 12.        animal1.greets(); 13.        Animal animal2 = new Dog("D"); 14.        animal2.greets(); 15.        Animal animal3 = new BigDog("Big"); </pre>	<pre> 16. animal3.greets(); 17. Animal animal4 = new     Animal("A"); 18. // Downcast 19. Dog dog2 = (Dog)animal2; 20. BigDog bigDog2 =     (BigDog)animal3; 21. Dog dog3 = (Dog)animal3; 22. Cat cat2 = (Cat)animal2; 23. dog2.greets(dog3); 24. dog3.greets(dog2); 25. dog2.greets(bigDog2); 26. bigDog2.greets(dog2); 27. bigDog2.greets(bigDog1); 28. } } </pre>
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- c) The previous example contains examples for compile-time polymorphism and run-time polymorphism. Please write an example of each. [4 marks]

**Question (3): [10 marks]**

- a) Extend the code shown in the opposite figure to handle the exception that can occur when opening a file that does not exist. You do not have to add the import that is needed for the exception. [3 marks]
- b) In the following code segment, print method is a generic method. Write the definition of print method using two different method headers. [5 marks]

```

public void readFile(String filename) {
    File file = new File(filename);
    Scanner scan = new Scanner(file);
}

```

<pre> 1. public class GenericMethodDemo { 2.     public static void main(String[] args ) { 3.         Integer[] integers = {1, 2, 3, 4, 5}; 4.         String[] strings = 5.         {"London", "Paris", "New York", "Austin"}; 6.         print(integers); 7.         print(strings); } </pre>	<pre> 7. //print method should be defined here 8. 9. 10. 11. </pre>
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- c) What is the output of the following code?

[2 marks]

<pre> /* Test.java: Define threads using the Thread class*/ public class Test {     public static void main(String[] args)     {         new Test();     }     public Test() {         // Create threads         PrintChar printA = new PrintChar('a', 4);         PrintChar printB = new PrintChar('b', 4);         // Start threads         printA.run();         printB.run();     } } </pre>	<pre> class PrintChar implements Runnable {     private char charToPrint; /* The character to print*/     private int times; /* The times to repeat*/     public PrintChar(char c, int t) {         charToPrint = c;         times = t;     }      public void run() {         for (int i = 0; i &lt; times; i++)             System.out.print(charToPrint);     } } </pre>
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**END of Exam, Good Luck**