Exam 1 - (20 points)
Answer all of the following questions. READ EACH QUESTION CAREFULLY. Fill the correct bubble on your scantron sheet. Each correct answer is worth 1 point (unless otherwise stated). Each question has EXACTLY one correct answer.

1. Consider the following code snippet
   ```java
   Bus bus1 = new Bus(5);
   ```
   When discussing this snippet, how should you refer to the number 5?
   a) actual parameter
   b) static field
   c) formal parameter
   d) just a number
   e) none of the above

2. Considering the code snippet from question 1, how should you refer to bus1?
   a) placeholder
   b) instance method
   c) static method
   d) object
   e) none of the above

3. Using the Java class uwcse.graphics.Rectangle, which statement would you write to create a square with a side-length of 20 pixels, centered at x=200 and y=300?
   a) new Rectangle();
   b) new Rectangle(180, 280, 40, 40);
   c) new Rectangle(190, 290, 20, 20);
   d) new Rectangle(200, 300, 20, 20);
   e) none of the above

4. You are programming a simple version of a roulette wheel. You need to generate a random integer that can be 1, 2, 3,..., or 36. Which of the following expression would you select? (Recall that Math.random() returns a random double >=0 and <1)
   a) Math.random() * 36
   b) (int)(Math.random() * 36) + 1
   c) ((int)Math.random()) * 36 + 1
   d) (int)(Math.random() * 36)
   e) (int)(Math.random() + 36)

5. A reference type variable is
   a) the same as a primitive type variable
   b) not commonly used in Java
   c) referring to another variable which is of primitive type
   d) defined by a class
   e) none of the above
6. Given the class diagram on the whiteboard, how could one appraise a 5 bedroom, 3 bathroom, 2506.7 square foot house with one line of code? 
   a) new BluePrint(5, 3, 2506.7).appraise();
   b) new BluePrint().appraise(5, 3, 2506.7);
   c) appraise(BluePrint(5, 3, 2506.7));
   d) h1.appraise();
   e) none of the above

7. Given the class diagram on the whiteboard, how could one estimate the rent for a 2 bedroom, 1 bathroom, 851.2 square foot house and store it in the variable r with 2 lines of code? 
   a) BluePrint h = new BluePrint(1, 2, 851.2);  
      double r = h.estimateRent();  
   b) BluePrint h = new BluePrint();  
      double r = h.estimateRent(2, 1, 851.2);  
   c) BluePrint h = new BluePrint(851.2, 2, 1);  
      double r = h.estimateRent();  
   d) BluePrint h = new BluePrint(2, 1, 851.2);  
      double r = h.estimateRent();  
   e) none of the above

8. Given the class diagram on the whiteboard, is a default constructor generated by Java automatically? 
   a) YES  
   b) NO

9. You read the following statement in a Java program that compiles and executes. 
   airplane.cruise(altitude);
   What can you say for sure? 
   a) altitude must be an int  
   b) cruise must be a method.  
   c) cruise must be the name of an instance field.  
   e) airplane must be the name of a class

10. Given the class diagram on the whiteboard, appraise and estimateRent are referred to as 
    a) static methods  
    b) instance fields  
    c) constructors  
    d) b and c  
    e) none of the above

11. Evaluate the following boolean expression: 5<2 || 7>5 
    a) true 
    b) false
12. Inside a class how should one write the first line defining an instance method m() that does NOT return a value when the method is called?
   a) public static main m() {
   b) private boolean m() {
   c) public static m() {
   d) public void m() {
   e) none of the above

13. Given \( P = \text{false} \) and \( Q = \text{true} \)
    evaluate the boolean expression \((!P) \land Q\)
   a) true
   b) false

14. Given \( P = \text{true} \) and \( Q = \text{false} \)
    evaluate the boolean expression \((!P) \land Q\)
   a) true
   b) false

15. Given the class diagram on the whiteboard, if we create an object called house1 by writing:
    BluePrint house1 = new BluePrint();
    how many bedrooms will house1 have?
   a) 5
   b) 2
   c) 1
   d) not enough information given
   e) none of the above

16. Given the class diagram on the whiteboard, the variables \text{bedrooms}, \text{bathrooms}, \text{and squareFootage} are referred to as
   a) instance fields
   b) constructors
   c) objects
   d) a and c
   e) none of the above

17. (3 points!) On your blank sheet of paper draw an object diagram that shows the memory allocation after the following code is executed
    Dog a = new Dog();
    Dog b = new Dog();
    Dog c = new Dog();
    a = b;
    b = null;
    c = a;

18. Given the object diagram on the board, which objects are aliases of each other?
   a) no aliases
b) x and y

c) x and z

d) y and z

e) x, y, and z

EXTRA CREDIT (2 points!): Given the object diagram on the board, write the code that would produce it. (Assume you have access to a defined constructor `Person()`.) Write your answer on your blank sheet of paper and label it – EXTRA CREDIT.
17. Solution

a

Dog

b null

Dog

c

Dog

a is an alias of c

Extra Credit: Solution

Person x = new Person();
Person y = x;
Person z = new Person();
y = null;
x = z;