CST8132 (15F) Midterm Test: Student Name _____

Test Version A

Instructions (Read These):

- **Starting the test before permission has been given will result in an immediate zero. Everyone starts at the same time once everyone is seated.**
- **Turn mobile phones / mobile devices off**
- **Remove all papers, books, laptops etc. from the desks**
- **Using any electronic device – laptop, mobile phone, PDA, calculator during the test will result in immediate zero**
- **Strictly no talking for any reason during the test or you get zero, unless to ask the professor a question If you complete your test early, do not talk to friends who are still taking the test.**
- **Write your name at the top of the test document on page 1 and at the end for part 2, as well as on the Multiple Choice Answer Sheet.**
- **Assume code samples shown will run / compile as part of a larger code listing, unless there is an option provided "does not compile" or similar for a possible answer**
- **All questions are within the context of Java, and computer programming**
- **If you see what you think may be a mistake raise your hand and ask quietly when I reach you**
- **Please do not leave the room during the first 30 minutes of the test.**
- **All test materials must be returned at the end of the test**

Additional Notes:
(**No Calculators allowed)**

The test is in two parts:

Part 1 is multiple-choice questions

- Place your answers for Part 1 onto the provided answer sheet, only the answer sheet will be used for grading Part 1 (The answer sheet is the last page of the test, feel free to detach).
- Note: Make sure your handwriting is readable; I suggest using upper case letters ensuring that D looks different from B.

Part 2 is short answer

- Place your answers for Part 2 into the spaces provided. If you need more room clearly note that your answer is continued on extra paper, and on the extra paper clearly indicate what question you are continuing.

- There is an extra blank page at the end of the test you can detach to use as scrap paper, remember to return all sheets at the end of the test, including scrap paper.

Ensure that your name is on all parts of the test:

- Multiple Choice answer sheet
- The test (this document)
- Any extra sheets you detach

Total Test Time will be 1 hour 50 minutes

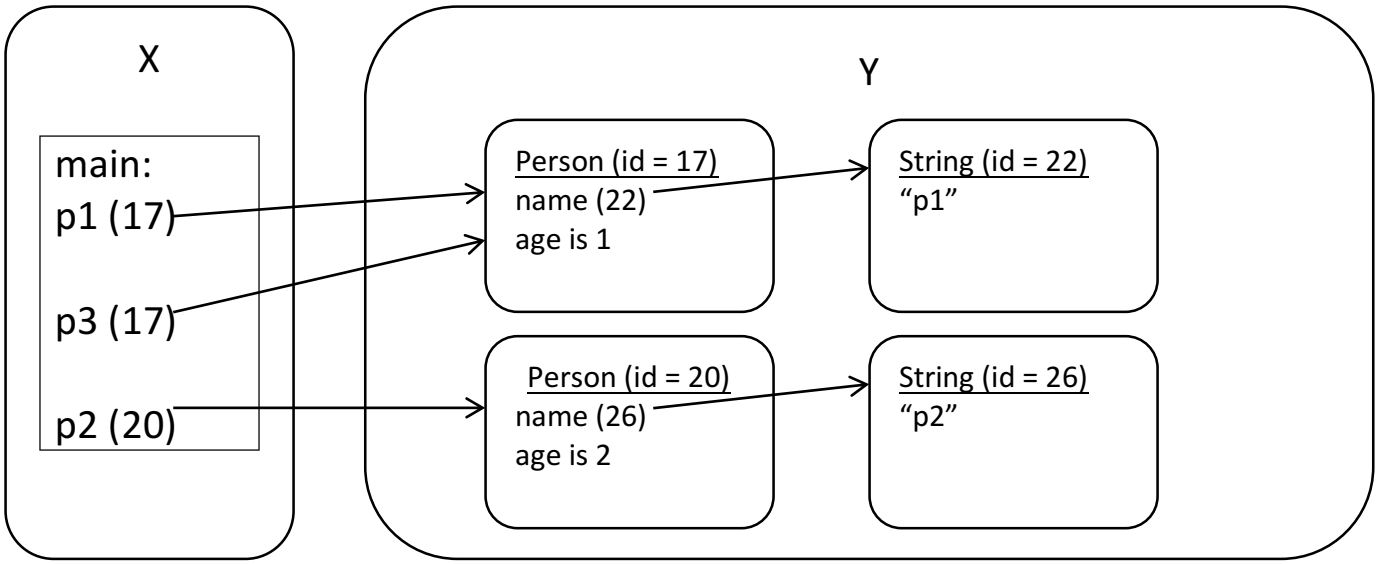
Part 1: Multiple Choice, 35 Questions, 70 points (2 points each)

1. What command line command is used to compile a java source code file?
   a) java
   b) javac
   c) javadoc

2. When a method is called a _____ is placed onto the method call stack to reserve memory for the method while it executes.
   a) Memory unit
   b) Stack Frame
   c) Heap

3. Which of the code samples below places a Person object onto the heap (assuming we have a class Person)?
   a) Person p;
   b) new Person();
   c) new Person[1];

Figure 1.0



4. Refer to figure 1.0: What does X represent?
   a) Stack
   b) Heap
   c) Registers

5. Refer to figure 1.0: How many objects are depicted in memory in the heap in the diagram?
   a) 3
   b) 4
   c) 7

Figure 2.0

```
public class Person {
    private String name;
    private int age;
    public Person(String name, int age){ this.name = name; this.age = age;}
    public Person(){ this("Person 1", 25); }
    public String getName(){ return this.name; }
    public void setName(String name){ this.name = name; }
    public int getAge(){ return this.age; }
    public void setAge(int age){ this.age = age; }
}
```

6. Refer to Figure 2.0: The class level variable **name** will be allocated onto the_____.
   a) Stack
   b) Heap
   c) Register

7. Refer to Figure 2.0: The class level variable **age** will be allocated onto the_____.
   a) Stack
   b) Heap
   c) Register

8. Refer to Figure 2.0: The parameter **String name** of method setName will be allocated onto the_____.
   a) Stack
   b) Heap
   c) Register

9. Which of the lines of code below will declare a multidimensional array that will store 4 int values?
   a) `int[][] numbers11 = new int[1][1];`
   b) `int[][] numbers22 = new int[2][2];`
   c) `int[][] numbers44 = new int[4][4];`

10. Examine the code below, how many Person objects will be allocated in memory after the line has executed?

```
Person[][] p = new Person[4][4];
```

   a) 44
   b) 16
   c) none

11. Examine the code below, what value will be stored at index [2][2]?

```
int[][] numbers = int[10][10];
for(int row = 0; row < numbers.length; row++){
    for(int column = 0; column < numbers[row].length; column++){
        numbers[row][column] = row * column;
    }
}
```

a) 2
b) 4
c) 22

12. What object oriented concept below is also known as data-hiding?
a) Inheritance
b) Polymorphism
c) Encapsulation

13. Given that the line of code below will not compile, what is the correct syntax for an explicit cast?

```
int a = 5.5D; // does not compile
```

```
a) int a = (double)5.5D;
b) (int) a = 5.5D;
c) int a = (int)5.5D;
```

14. Examine the code below, is this an example of method overloading or a compiler error?

```
public class Printer{
    public void print(String a){ System.out.println(a); }
    public void print(String b){ System.out.println(b); }
}
```

a) Overloading
b) Will not compile

15. Which of the code samples below correctly illustrates constructor chaining in Java?

```
a) public MobilePhone(double height, double width)
   { this(height, width, 9); }
b) public MobilePhone(double height, double width)
   { height.this, width.this, 9.this); }
c) public MobilePhone(double height, double width)
   { MobilePhone(height, width, 9);}
```

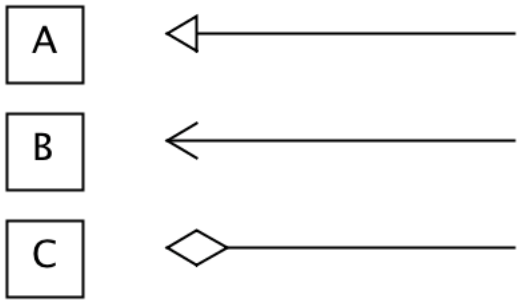
16. Which of the following is an immutable sequence of characters?
a) StringBuilder
b) StringBuffer
c) String

17. When using StringBuilder what method is used to concatenate text?

```
a) builder.add("text");
b) builder.append("text");
c) builder.concatenate("text");
```

18. What concept below indicates there is a has-a relationship between two objects?
    a) Composition
    b) Aggregation
    c) Association

Figure 3.0



19. Examine Figure 3.0: What UML arrow is used to represent Aggregation?
    a) A
    b) B
    c) C

20. Examine Figure 3.0: What UML arrow is used to represent Inheritance?
    a) A
    b) B
    c) C

21. When working with JUnit, we use the _____ annotation to mark test methods.
    a) @TestMethod
    b) @Test
    c) @CheckThis

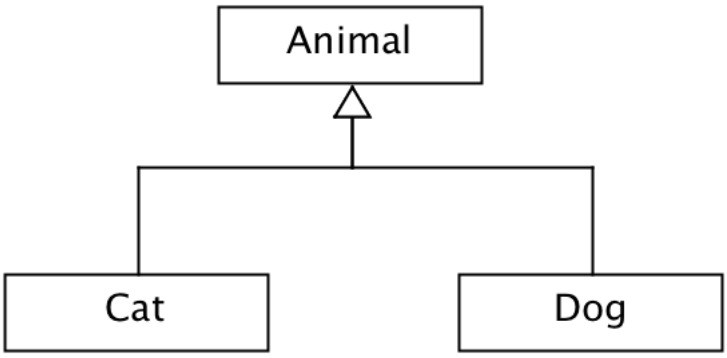
22. Which of the following is not one of the recommended 4 steps for every JUnit test method?
    a) Prepare objects and variables (use meaningful variable names)
    b) Perform many tasks (typically changing the objects states, getting all return values etc.)
    c) Perform tear-down of resources to prep for next test

23. Which of the following assert methods is best suited for comparing two double values?
    a) assertEquals(String message, double expected, double actual, double delta)
    b) assertTrue(String message, boolean condition)
    c) assertNotNull(String message, Object object)

24. Inheritance is described as a(n) _____ relationship between objects.
    a) Has-a
    b) Is-a
    c) Uses-a

25. What method inherited from class Object is meant to return a String representation of the object?
    a) equals( )
    b) toString( )
    c) hashCode( )

Figure 4.0



26. Examine Figure 4.0: Class Animal is the _____ of classes Cat and Dog.
    a) Superclass
    b) Subclass
    c) TransientClass

27. Examine Figure 4.0: Class Cat is a _____ of class Animal.
    a) Superclass
    b) Subclass
    c) TransientClass

28. Java supports _____ inheritance.
    a) Multiple
    b) Transverse
    c) Single

29. The protected modifier in Java means that the protected member is accessible within the class _____.
    a) and other classes in the package, and all subclasses inside and outside the package.
    b) and other classes in the package, but no classes outside the package.
    c) and no where else.

30. What keyword is used to indicate a classes superclass?
    a) inherits
    b) extends
    c) subclasses

31. Why should we apply the annotation @Override to inherited methods we are overriding in a subclass?
    a) @Override is required
    b) @Override asks the compiler to ensure we do not accidentally overload the method
    c) Both of the above

32. What does the code sample below illustrate?
(Refer to figure 4.0 and assume method makeNoise( ) exists in class Animal and was overridden in classes Cat and Dog).

```
public static void main(String[ ] args){
    Animal[] animals = new Animal[2];
    animals[0] = new Cat();
    animals[1] = new Dog();
    animals[0].makeNoise(); // outputs "Meow"
    animals[1].makeNouse(); // outputs "Woof woof"
```

a) Object states
b) Polymorphism
c) Initializing an array with int values, e.g. [0]

33. What class is the super class of all Exceptions and Errors in Java?
a) Throwable
b) Exeception
c) Error

34. You should never attempt to catch _____ or one of it's subclasses.
a) Throwable
b) Exeception
c) Error

35. What is an unchecked exception and what is special about it?
a) Subclass of RuntimeException, the compiler forces you to write a try-catch
b) Subclass of RuntimeException, the compiler does not force you to write a try-catch
c) Subclass of Exception, the compiler does not force you to write a try-catch

Part 2: Short Answer Questions 30 points [points shown for each question, spend time wisely]

1. Using the code provided draw a memory map to represent Stack and Heap just at the end of method main. [5 points]

```
public class Person {
    private String name;
    private int age;
    public Person(String name, int age){ this.name = name; this.age = age;}
    public Person(){ this("Person 1", 25); }
    public String getName(){ return this.name; }
    public void setName(String name){ this.name = name; }
    public int getAge(){ return this.age; }
    public void setAge(int age){ this.age = age; }
}

public class PersonDemo{
    public static void main(String[] args){
        Person[][] p = new Person[1][2];
        p[0][0] = new Person("Tuna", 35);
        p[0][1] = new Person("Beans", 40);
        // draw memory map from here
    }
}
```

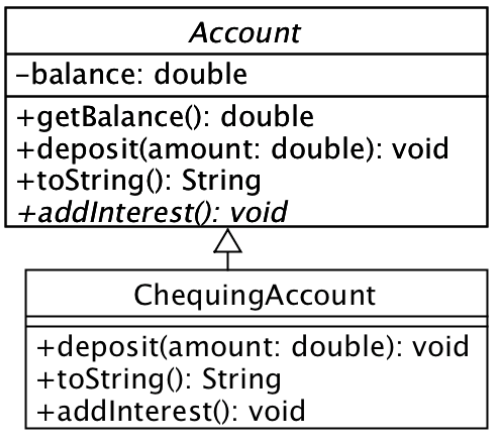
2. Write a loop so that the array shown will have its elements set to the value of adding the indexes, e.g. element at index [0][1] will be set with a value of 1, element at index of [2][1] will be set to 3 (etc.) [4 points]

```
int[][] n = new int[3][2];
```

3. Draw a memory map of the array from question 2 after it has been initialized with the requested numbers. [6 points]

4. Examine the figure below as well as the code for class Account then write the code for class ChequingAccount:
   - ChequingAccount deposit should deduct 5 cents from the deposit for a service fee
     E.g. deposit 50 cents, balance only increases 45 cents
   - Expected output from ChequingAccount toString is: Chequing Account Balance: $0.00
     (Assuming the account was created but has a balance of zero)
   - addInterest() should add 5% of the current balance to the balance as a deposit.

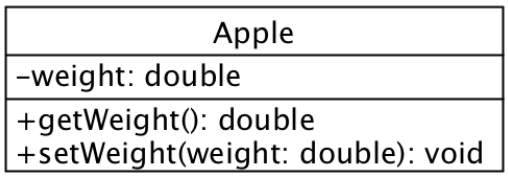
   [5 points]




```
public abstract class Account{
   private double balance;
   public double getBalance(){ return balance; }
   public void deposit(double amount){ balance += amount; }
   @Override
   public String toString(){ return String.format("$%.2f", balance); }
   public abstract void addInterest();
}
```

Tip: Don't forget extends, super. , StringBuilder and @Override

5. Using the words presented as a guide write a JUnit test method to test that methods getWeight() and setWeight(double) of class Apple work correctly. (Each word may be used more than once.)
[5 points]



Words

@Test	new	apple	expected	actual	double	testWeightGetSet
Apple	Apple()	getWeight	setWeight	assertEquals	delta	0.01
String	message	"Apple weight get set not working"				

6. Using the words provided as a guide and the starter code re-write the main method presented so that if the user enters the phase "tuna fish" the program will report the exception's message and then exit rather than crashing. Note: Need to use exception handling.
(Most of the words below only need to be used once)
[5 points]

```
import java.util.Scanner; // no need to rewrite the import

public class AgeProgram{
    public static void main(String[] args){
        Scanner s = new Scanner(System.in);
        System.out.println("What is the age?");
        int n = s.nextInt();
        System.out.println("Age entered as: " + n);
    }
}
```

Words

try	Exception	getMessage	catch	e

Scrap Paper, Name: _____

Scrap Paper, Name: _____

Full Name: _____

CST8132 15F Multiple Choice Question Answer Sheet: Term Test A

Note: Question numbers are vertical down the page

Question Number	Letter Answer
1	
2	
3	
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Question Number	Letter Answer
13	
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Question Number	Letter Answer
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