1. Section: ##
   Due date and time: ##-##-#### at ##:## ##

Full Name in CAPITAL LETTERS | SFSU ID

2. Final Exam (1 exam, 0 dropped): 50 Points

3. This exam is in-person, paper-based, and in the same classroom. You must take the exam in the course section you enrolled in.

4. This exam is a must-take; otherwise, the course letter grade will be an F.

5. Show your work, using pens, not pencils. Your writing must be clear and readable to the graders. Your answers must be detailed.

6. Turn off your devices before the test. Leave all of your belongings except your pen(s) under the whiteboards in front.

7. An F grade will be assigned for the course to a student who poisons the testing environment of others, who prejudices the effort of others, or who infringes on the rights of others. Please refer to the course's policies.

8. This exam is closed-book, closed-note, and closed-IDE. Strictly only communication with the exam proctors is allowed.

9. To prepare for this exam, please review all the related materials including the packages, slides, mock exam, reading assignments, in-class practices, sample programs posted in the File Manager, and assignments.

10. Please ask all your questions, if any, during the review sessions. Thank you.

HONOR CODE:

- Please strictly follow:

- The Course Policy on Student Conduct and Academic Honesty
- The instructions which are given in class, on Canvas, and during the exam

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PART A – 20 Points

A.1 - 2 Points – *Your answer must be in your own words, be in complete sentences, and provide very specific details to earn credit.*

How is a **programmer** different from a **coder**?

A.2 - 2 Points – *Your answer must be in your own words, be in complete sentences, and provide very specific details to earn credit.*

Please list and explain the general components of a Java class that represents lower-division Computer Science students.

A.3 - 4 Points – *Your answer must be in your own words, be in complete sentences, and provide very specific details to earn credit.*

Please list and explain 3 differences between static variables and non-static variables.

A.4 - 4 Points – *Your answer must be in your own words, be in complete sentences, and provide very specific details to earn credit.*

Please explain Inheritance and explain Polymorphism. Explain the connection between these 2 OOP concepts. What are the OOP pillars?

A.5 - 4 Points – *Your answer must be in your own words, be in complete sentences, and provide very specific details to earn credit.*

Please list and explain 3 differences between Up-casting and Down-casting.

A.6 - 4 Points – *Your answer must be in your own words, be in complete sentences, and provide very specific details to earn credit.*

Please explain how the below operator and methods work. What are the differences among them?

1. equality operator ==

2. equals method

3. compareTo method

4. Differences

PART B – 30 Points

B.1 - 5 Points – *Your answer must be in your own words, be in complete sentences, and provide very specific details to earn credit.*

Please code a complete Java program: `VacationAgency`
- Your program prompts users to enter their favorite Summer vacation destination choice.
- Then the program prints a recommendation on how to get there.
- It is OK to assume that users will enter a valid location as their favorite Summer vacation destination.
- This program must have at least 3 methods. (1 of them is the main method.)
- A sample run of the program (think Google Maps):

```
Enter your Summer vacation destination: Phu Quoc Island
Flight Vietnamese Airlines!
```

Note: "Phu Quoc Island" is one valid destination choice. You can choose a different destination for your code (and sample run).

B.2 to B.4 Questions are linked to each other

B.2 - 5 Points – *Your answer must be in your own words, be in complete sentences, and provide very specific details to earn credit.*

Please choose a real-life entity then write a Java class to represent it. The entity must be part of San Francisco State University.

What is that entity?

Why do you think it is suitable to be a Java class?

Please code the class. Your class should have data fields, constructors, and methods.

B.3 - 5 Points – *Your answer must be in your own words, be in complete sentences, and provide very specific details to earn credit.*

Please write code to add another data field to your class to keep track of the number of objects created.

Please explain in detail how the data field should be used. Provide code to demonstrate and support your explanation.

Then explain in detail why your code should work properly. Provide code to demonstrate and support your explanation.

B.4 - 5 Points – *Your answer must be in your own words, be in complete sentences, and provide very specific details to earn credit.*

Write a no-argument constructor, a two-argument constructor, and a four-argument constructor for your class.

Code instructions to create 3 objects using all constructors above.

B.5 - 5 Points – *Your answer must be in your own words, be in complete sentences, and provide very specific details to earn credit.*

Singer and **Student** and subclasses of **Person**.

1. Please write the header line of each class. Then please explain in detail what happens when a Singer constructor is called. Please explain both the explicit and implicit code.

2. Please write code to demonstrate a subclass reference to reference a subclass object.

3. Please write code to demonstrate a superclass reference to reference a subclass object,

4. Please write code to demonstrate up-casting,

5. Please write code to demonstrate down-casting,

B.6 - 5 Points – *Your answer must be in your own words, be in complete sentences, and provide very specific details to earn credit.*

Please override the method **compareTo** to compare **Phone** objects.

PLEASE DO NOT DETACH THIS PAGE FROM YOUR EXAM.
You may get partial credit for what you write on this page.