

Student Name: _____ Student ID # _____

UOSA Statement of Academic Integrity

On my honor I affirm that I have neither given nor received inappropriate aid in the completion of this exercise.

Signature: _____ Date: _____

Notes Regarding this Examination

Open Book(s) You may consult any printed textbooks in your immediate possession during the course of this examination.

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No Electronic Devices Permitted You may not use any electronic devices during the course of this examination, including but not limited to calculators, computers, and cellular phones. All electronic devices in the student's possession must be turned off and placed out of sight (for example, in the student's own pocket or backpack) for the duration of the examination.

Violations Copying another's work, or possession of electronic computing or communication devices in the testing area, is cheating and grounds for penalties in accordance with school policies.

Question 1: Object-Oriented Design (40 points)

Jeff is interested in creating software to connect potential employees, particularly OU students and graduates, with available jobs in the Norman area. For potential employees, Jeff wants to know whether each is a current or former OU student, a college graduate, or has no OU affiliation. For current or former OU students, he wants to know how many years of college they have completed in what areas of study and what degrees they have already obtained, if any. Of course, he also wants to know whether they are currently enrolled. For OU graduates, he wants to know what degrees they have obtained. For all potential employees, he wants to know prior work experience. For available jobs, Jeff wants to know whether the job is a volunteer (unpaid) job or a paid one. If the job is a paid position, he wants to know the rate of pay. For all jobs, Jeff wants to know the job title, the name of the organization looking to have the job done, the job's start and end date (if there is one), the application deadline for the job, and a contact person at the organization. For all people, Jeff wants to know their name, email address, phone number, and postal address.

A. Draw a simplified UML class diagram that shows appropriate classes and/or interfaces to handle the types of objects described above. In this simplified UML, you do not need to include methods or the types for variables. However, class, interface, and variable names should be included along with accessibility modifiers for the variables and indications of whether each class is concrete or abstract. Also be sure to indicate in the diagram where the listed information is stored and the relationships between the classes and/or interfaces.

Please note that you *may* use multiple inheritance in this design if you believe it would be appropriate.

[Additional space for UML for Question 1, Part A.]

B. If you used inheritance anywhere in your UML for Part A above, describe where you used it in your design and *explain why* using inheritance improves this design. If you did not use inheritance anywhere in your UML for this design, *explain* a situation in which using inheritance would improve OO design.

C. If you used *multiple* inheritance anywhere in your UML for Part A above, describe where you used it in your design and *explain why* using multiple inheritance improves this design. If you did not use multiple inheritance anywhere in your UML for this design, *explain* a situation in which using inheritance would improve OO design.

D. If you used composition or aggregation anywhere in your UML for Part A above, describe where you used it in your design and *explain why* using composition or aggregation improves this design. If you did not use composition or aggregation anywhere in your UML for this design, *explain* a situation in which using composition or aggregation would improve OO design.

E. If you used interface(s) (in the sense of a group of related methods with empty bodies) anywhere in your UML for Part A above, describe where you used interface(s) in your design and *explain why* using interface(s) improves this design. If you did not use interface(s) anywhere in your UML for this design, *explain* a situation in which using interface(s) would improve OO design.

Question 3: Polymorphism and Inheritance (20 points)

List each type of polymorphism we have discussed in class and explain how it is related to inheritance.

A. One Type of Polymorphism.

B. A Second Type of Polymorphism.

C. A Third Type of Polymorphism.

D. A Fourth Type of Polymorphism.

Question 4: Abstractions and Design (10 points)

Explain how information hiding is related to stub code.

Question 5: Coding Conventions (10 points)

Describe two coding conventions related to accessor methods. *Explain why* it is important to follow each convention.

A. First Convention.

B. Second Convention.

Question 6: Java Collections Framework (JCF) and Generics (20 points)

A. List one reason to use `LinkedList` rather than arrays. *Explain your answer.*

B. List one reason to use `LinkedList` rather than `ArrayList`. *Explain your answer.*

C. List one reason to use `ArrayList` rather than `LinkedList`. *Explain your answer.*

D. List one advantage of the current JFC that uses generics over the older JCF that did not use generics. *Explain your answer.*