

EXAMINATION INSTRUCTIONS

This examination has 6 pages. Check that you have a complete paper.
Each candidate should be prepared to produce, upon request, his or her SUNY/UB card.

This examination has 5 questions. Answer all questions.

You have 60 minutes to complete this examination. Use your time accordingly.

READ AND OBSERVE THE FOLLOWING RULES:

- ▶ Names are pre-printed on the exam booklets. Ensure that you have YOUR exam.
- ▶ Sign, using your usual signature, in the space provided on the back cover.
- ▶ All of your writing must be handed in. This booklet must not be torn or mutilated in any way, and must not be taken from the examination room.
- ▶ Show all of your work in arriving at an answer, unless instructed otherwise. Partial credit will be awarded as appropriate.
- ▶ Candidates are not permitted to ask questions of the invigilators, except in cases of supposed errors or ambiguities in examination questions.
- ▶ CAUTION – Candidates guilty of any of the following, or similar, dishonest practices shall be immediately dismissed from the examination and shall be liable to disciplinary action.
 - ◆ Making use of any books, papers or memoranda, calculators or computers, audio or visual cassette players, or other memory aid devices, other than those explicitly authorised by the examiners.
 - ◆ Speaking or communicating with other candidates.
 - ◆ Purposely exposing written papers to the view of other candidates. The plea of accident or forgetfulness shall not be received.

----- DO NOT WRITE BELOW THIS LINE! -----

Q1	Q2	Q3	Q4	Q5	TOTAL	%
/10	/10	/10	/10	/10	/50	/100

Question 1 [10 points, 2 points each]

The code given below is correct: it compiles without errors. I have added some extra spacing to make this question easier to answer.

Circle, and identify by number, one **and only one** example of each of the following items in the code below. If you believe no example exists, write “*no example*” next to that item in the list. To show you how I want the question answered, *the first one is done for you*.

1. access control modifier
2. fully qualified name
3. parameter declaration
4. expression
5. scope of instance variable declaration
6. assignment statement

```
package exam1;
```

```
1 public class Store {
```

```
    private institution.financial.Bank _money;
```

```
    public Store( institution.financial.Bank m ) {
```

```
        _money = m ;
```

```
    }
```

```
}
```

Question 2 [10 points, 2 points each]

For each of the following questions, select the **BEST** answer from the available choices.

[2 POINTS] From which area of memory does 'new' allocate space?

- a) secondary storage
- b) heap
- c) static region
- d) runtime stack

[2 POINTS] What is the value of a 'new' expression, such as new example1.BarnYard() ?

- a) a reference
- b) an instance
- c) a variable
- d) an object

[2 POINTS] Where in memory are local variables stored?

- a) secondary storage
- b) heap
- c) static region
- d) runtime stack

[2 POINTS] Which answer best explains the effect of carrying out the assignment $x = y$ where x and y are both variables of type example1.Rg?

- a) x and y hold references to the same example1.Rg object
- b) x and y hold references to different example1.Rg objects
- c) x and y are the same example1.Rg object
- d) x holds a reference to y , and y holds a reference to an example1.Rg object

[2 POINTS] Where in memory are method invocation records stored?

- a) secondary storage
- b) heap
- c) static region
- d) runtime stack

Question 3 [10 points, 2 points each]

The code sample given below is correct: it compiles without errors.

```
package exam1;
public class Zoo {
    public Zoo() {
        Habitat jungle;
        jungle = new Habitat();
        Tiger tigger;
        tigger = new Tiger();
        Lion nala;
        nala = new Lion();
        jungle.addTiger(new Tiger());
        jungle.addTiger(tigger);
    }
}
```

ANSWER THE QUESTIONS BELOW:

- a) How many variables are declared in the code shown above? [2 points]

For questions **(b) through (e)** assume that the class **exam1.Zoo** is instantiated once.

- b) How many Habitat objects are created? [2 points]
- c) How many Tiger objects are created? [2 points]
- d) How many Lion objects are created? [2 points]
- e) How many Zoo objects are created? [2 points]

Question 4 [10 points – 10 points perfect, 7 points essentially correct but with small mistakes, 3 points clearly wrong but with some correct elements, 0 points for anything else]

Draw an object diagram which corresponds to the following memory diagram.

234		18952	
235	18952	18953	
236	18956	18954	
237		18955	
238	18959	18956	
239	18956	18957	
240		18958	
241		18959	

Assume that the variable *r* has location 235, *s* has location 236, *t* has location 238 and *u* has location 239. Also assume that *r* is of type Dog, *s* is of type Cat, *t* is of type Rabbit and *u* is of type Cat.

Draw an object diagram which corresponds to the memory diagram.

Question 5 [10 points – 10 points perfect, 7 points essentially correct but with small mistakes, 3 points clearly wrong but with some correct elements, 0 points for anything else]

In this question you must define a class. The class must be in a package whose name matches your last name. The class itself must be the same as your first name. Define two instance variables in this class, one of type State and one of type County. Assume that constructors State() and County() are defined for these classes. You may name the instance variables however you wish, as long as you follow the naming rules and conventions that we have been using in class. Make sure that each instance variable is initialized to a new instance.

Write your code below: