

Question 1

[25 marks]

In the code below, clearly *circle and identify by number* one (and only one) example of each of the following. If you believe no example exists in the given code, write “*no example*” next to that item.

1. a visibility modifier

e.g. public

2. a field declaration

no example

3. an overriding method definition

entire applyTo definition in Negate

4. an accessor method

no example, or e.g. getRed method call

5. a mutator method

no example, or e.g. setRed method call

```
public class CSEPicture extends Picture {

    public CSEPicture(String filename) {
        super(filename);
    }

    public void doSomething(Operation operation) {
        int x = 0;
        while (x < this.getWidth()) {
            int y = 0;
            while (y < this.getHeight()) {
                Pixel p = this.getPixel(x,y);
                operation.applyTo(p);
                y = y + 1;
            }
            x = x + 1;
        }
    }
}

public class Operation {
    public void applyTo(Pixel p) {}
}

public class Negate extends Operation {
    public void applyTo(Pixel p) {
        p.setRed(255 - p.getRed());
        p.setGreen(255 - p.getGreen());
        p.setBlue(255 - p.getBlue());
    }
}
```

Question 2

[35 marks]

Define an Operation for the CSEPicture class which halves the red, green and blue color components of a Pixel.

Answer:

```
public class Half extends Operation {
    public void applyTo(Pixel p) {
        p.setRed(p.getRed()/2);
        p.setBlue(p.getBlue()/2);
        p.setGreen(p.getGreen()/2);
    }
}
```

Question 3

[15 marks]

Assume that `pict` is a variable referring to an instance of `CSEPicture`, the class given in the first question of this exam. Using the `Operation` described in the previous question (assume it is defined) write code which will halve the red, green and blue color components of each `Pixel` in `pict`. Note that you may not redefine or extend the `CSEPicture` class in order to answer this question.

Answer:

```
pict.doSomething(new Half());
```

Question 4

[25 marks]

Define a class whose name is your last name, which has an int field named `_value` and whose value is initialized in a constructor of the class to the first two digits of your person number. Next, define a simple accessor method and also a simple mutator method for this field.

Answer:

```
public class Alphonse {
    private int _value;
    public Alphonse() {
        _value = 99;
    }
    public int getValue() {
        return _value;
    }
    public void setValue(int val) {
        _value = value;
    }
}
```

Solution to third examination — 10% Name (print, surname first): _____

May 8, 2007 [Exam version 6 of 5] Signature: _____

45 minutes Exam serial number: _____ Person #: _____

This examination has 5 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 4 questions. Answer all 4 questions.

READ AND OBSERVE THE FOLLOWING RULES:

- ▷ Write the following, in ink, in the space provided above,
 - ◊ your name, surname first,
 - ◊ your usual signature, and
 - ◊ your UB person number,
- ▷ 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!

Question	Points
1	/25
2	/35
3	/15
4	/25
TOTAL	/100