

Family Name:

Other Names:

ID Number:

COMP 102: Test 2

Model Solutions

17 Sep, 2010

Instructions

- Time allowed: **45 minutes**
- There are 45 marks in total.
- Answer **all** the questions.
- Write your answers in the boxes in this test paper and hand in all sheets. You may ask for additional paper if you need it.
- If you think some question is unclear, ask for clarification.
- Brief Java documentation will be supplied with the test.
- This test will contribute 15% of your final grade, if it helps your grade.
- Non-electronic translation dictionaries and calculators without a full set of alphabet keys are permitted.

Questions

Marks

1. Basic Java

[15]

2. Event Driven Input

[6]

3. Two Class programs

[12]

4. Files

[12]

TOTAL:

SPARE PAGE FOR EXTRA ANSWERS

Cross out rough working that you do not want marked.
Specify the question number for work that you do want marked.

Question 1. Basic Java

[15 marks]

(a) [5 marks] Consider the following `printValue` method

```
public void printValue(int x){
    if (x < 10) {
        System.out.println(" 1: " + x);
        x = x * 2;
    }

    if (x < 15) {
        System.out.println(" 2: " + x);
        x = x + 10;
    }
    else {
        System.out.println(" 3: " + x);
        x = 20;
    }

    System.out.println("4: " + x);
}
```

(i) [1 mark] What will be printed if `printValue(20)` is called?

```
3: 20
4: 20
```

(ii) [2 marks] What will be printed if `printValue(3)` is called?

```
1: 3
 2: 6
 4: 16
```

(iii) [2 marks] What will be printed if `printValue(8)` is called?

```
1: 8
 3: 16
 4: 20
```

(Question 1 continued)

(b) [2 marks] What will the following fragment of Java print?

```
int x = 100;

while ( x >= 10) {
    x = x / 2;
    System.out.print(x + " ");
}
```

50 25 12 6

(c) [4 marks] Write a fragment of Java that will print out every number from 1 to 1000 and the square of each number, as in:

```
1 1
2 4
3 9
4 16
:
1000 1000000
```

```
int k = 1;
while ( k <= 1000 ){
    System.out.println(k + " " + k * k);
    k = k + 1;
}
```

(Question 1 continued on next page)

(Question 1 continued)**(d)** [4 marks] What will the following fragment of Java print?

```
int[ ] data = new int[ ]{10, 20, 30, 40,50};
int x = 0;
System.out.println(data [3]);
System.out.println(data.length);

for ( int i=0; i < data.length; i++){
    x = x + data[i];
}
System.out.println(x);
}
```

```
40
5
150
```

Question 2. Event-Driven Input

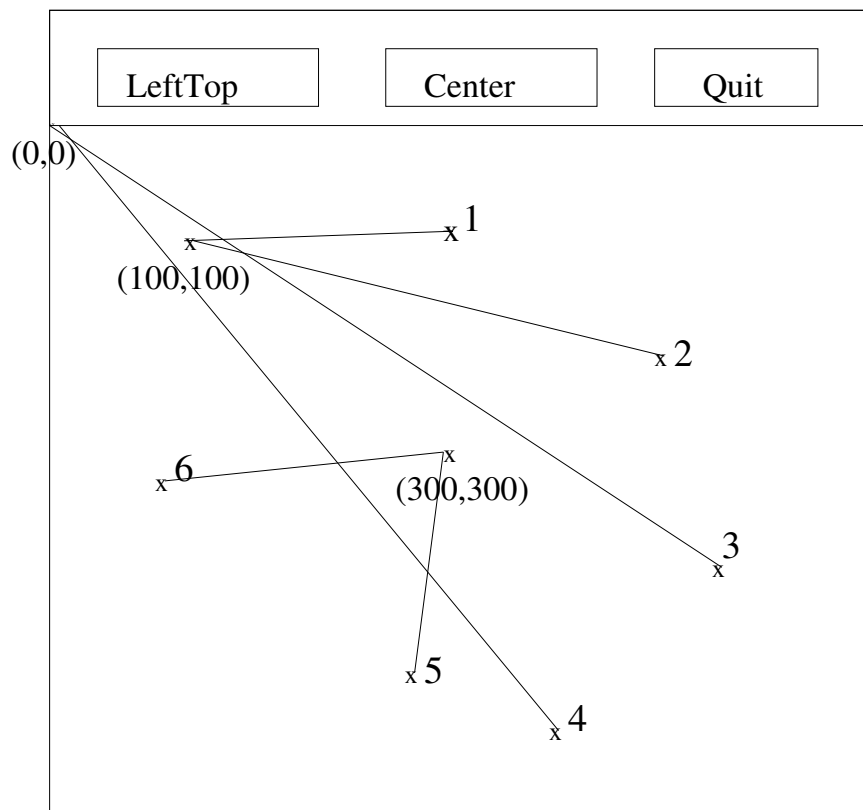
[6 marks]

Consider the `PatternWriter` class on the facing page, which constructs a simple GUI with three buttons and a canvas that responds to the mouse. It has two fields that store a position (`xPos`, `yPos`), and the initial position is at (100, 100).

Sketch below what the program would draw on the canvas if the user took the following actions in sequence:

1. press and release mouse at point 1
2. press and release mouse at point 2
3. press the "LeftTop" button
4. press and release mouse at point 3
5. press and release mouse at point 4
6. press the "Center" button
7. press and release mouse at point 5
8. press and release mouse at point 6

please note that the three positions with coordinates (0,0) (100,100) (300,300) are given in the figure.



(Question 2 continued on next page)

(Question 2 continued)

```

public class PatternWriter implements ActionListener, MouseListener{
    private JFrame frame;
    private DrawingCanvas canvas;
    private int xPos = 100;
    private int yPos = 100;
    public PatternWriter(){
        this.frame = new JFrame("TestGui");
        this.frame.setSize(600, 600);
        this.canvas = new DrawingCanvas();
        this.canvas.addMouseListener(this);
        this.frame.getContentPane().add(this.canvas, BorderLayout.CENTER);
        JPanel panel = new JPanel();
        this.frame.getContentPane().add(panel, BorderLayout.NORTH);
        JButton button = new JButton("LeftTop");
        button.addActionListener(this);
        panel.add(button);
        JButton cButton = new JButton("Center");
        cButton.addActionListener(this);
        panel.add(cButton);
        JButton qButton = new JButton("Quit");
        qButton.addActionListener(this);
        panel.add(qButton);
        this.frame.setVisible(true);
    }
    public void actionPerformed(ActionEvent e){
        String cmd = e.getActionCommand();
        if (cmd.equals("LeftTop")){
            xPos = 0;
            yPos = 0;
        }
        else if (cmd.equals("Center")){
            this.xPos = 300;
            this.yPos = 300;
        }
        else if (cmd.equals("Quit")){
            this.frame.dispose();}
    }
    public void mousePressed(MouseEvent e) {}
    public void mouseReleased(MouseEvent e) {
        this.canvas.drawLine(this.xPos, this.yPos, e.getX(), e.getY());
    }
    public void mouseClicked(MouseEvent e) {}
    public void mouseEntered(MouseEvent e) {}
    public void mouseExited(MouseEvent e) {}
}

```

Question 3. Two Class programs

[12 marks]

Consider the following program with two classes.

```
public class TutorHours{
    public static void main(String[] args) {
        Tutor t1 = new Tutor("Peter", 10);
        Tutor t2 = new Tutor("Lisa", 40);
        t1.printPay ();
        t2.printPay ();

        t1.addHours(6);
        System.out.println(t1.getHours());
        System.out.println(t2.getName()+ " " +t2.getHours());
    }
}
```

```
class Tutor {
    private String name;
    private double hours;

    public Tutor(String n, double m) {
        this.name = n;
        this.hours = m;
    }
    public Tutor(){
    }
    public String getName() {
        return this.name;
    }
    public double getHours(){
        return this.hours;
    }
    public void addHours(double d) {
        this.hours = this.hours + d;
    }
    public void printPay(){
        System.out.println("Name: " + this.name);
        System.out.println("Pay: $" + this.hours * 20);
    }
}
```

(Question 3 continued on next page)

(Question 3 continued)

(a) [6 marks] What will be printed out when the main method in the TutoHours class is called.

```
Name: Peter
Pay: $200.0
Name: Lisa
Pay: $800.0
16.0
Lisa 40.0
```

(b) [6 marks] Add a method `MaxHoursReached` in the `Tutor` class which returns a boolean value. If the tutor has worked more than 100 hours, it should call a method to print a payslip for the tutor, then reset the hours to zero and return `true`, otherwise, it should return `false`.

```
public boolean maxHoursReached() {
    if (this.hours >=100){
        this.printPay ();
        this.hours = 0;
        return true;
    }
    else
        return false;
}
```

Question 4. Files

[12 marks]

Suppose a file containing the following:

```
10
8
20
Monday 5
2
9 Friday
30 well done
12
```

Consider this method:

```
public void readData(String fname){
    try{Scanner sc = new Scanner(new File(fname));
        int x = 0;
        while (sc.hasNextInt()){
            System.out.println( sc.nextInt ());
            x = x + 1;
        }
        System.out.println(x);
    }catch(IOException e){System.out.println("File error: "+e);}
}
```

(a) [5 marks] What would the readData method print out if it were called on a file shown above?

```
10
8
20
3
```

(Question 4 continued)

(b) [7 marks] Complete the following `numbersOnly` method, so it reads data (integers and words) from the first file, and saves all the numbers to the second file. For example, for the file given in previous question, the second file should be:

```
10
8
20
5
2
9
30
12
```

```
public void numbersOnly(String first, String second){
    try{
        Scanner sc = new Scanner(new File(first));

        PrintStream p = new PrintStream(new File(second));

        while (sc.hasNext()){
            if ( sc.hasNextInt())
                p.println ( sc.nextInt ());
            else
                sc.next ();
        }
        p.close ();

    }catch(IOException e){System.out.println("File error: "+e);}
}
```

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