CMPT 166: Sample Midterm Answer Key

Last name *exactly as it appears on your student card*	**First name** *exactly as it appears on your student card*

Student Number									

SFU Email		**Section** if you know it!	

This is a **50 minute** test. It is **closed book**: no calculators, computers, notes, books, etc. are allowed.

Question	Out Of	Your Mark
Short Answer	16	
A Stack of Blocks	10	
Debugging	10	
Animation	10	
Total	**46**	

Short Answer

(16 marks) For each question, write the answer in the box provided.

(1 mark) What does CPU stand for?	Central Processing Unit
(1 mark) True or false: Processing is considered to be a **scripting** language.	FALSE
(1 mark) True or false: Processing is based on the **Java** programming language.	TRUE
(1 mark) Assuming the screen is 500-by-500 pixels, what are the coordinates of the pixel in the lower-**left** corner?	(0, 499)
(1 mark) Assuming the screen is 500-by-500 pixels, what are the coordinates of the pixel in the upper-**right** corner?	(499, 0)
(1 mark) What color does this RGB triple represent: (255, 255, 255)	white
(1 mark) Write a Processing statement that sets the **background** of the window to be **blue**.	background(0, 0, 255)
(1 mark) What is the name of the **type** of variable that Processing uses to store colors?	color

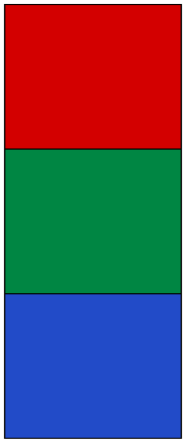
(2 marks) Write the code for the `setup` function that sets the size of the screen to be 200 pixels wide and 300 pixels high. Write the entire `setup` function.	void setup() {
	  size(200, 300);
	}

(1 mark) What is the file-name extension for a Processing source code file? **Hint**: The file-name extension for a PNG graphics file is .png, while the file name extension for a text file is usually .txt.	.pde
(1 mark) Briefly explain what `//` does in a Processing program.	// marks the beginning of a comment

(2 marks) Write a Processing statement that draws a square of side-length 10 at the location of the mouse pointer. Just write the one statement and nothing else. Assume this statement will be inside the `draw()` function. **Hint**: The last two parameters of the `rect` function specify its width and height.	rect(mouseX, mouseY, 10, 10);
(1 mark) True or false: if an if-statement has only one statement in its body, then you don't need to put the if-statement's body inside curly braces.	TRUE
(1 mark) Write an if-statement that tests if the variable `y` (a `float`), is greater than or equal to 499. In the body of the if-statement set `y` to 499.	if (y >= 499) y = 499;

A Stack of Blocks

(10 marks) Write a complete Processing program that draws the following diagram (with no animation):



The top square is red, the middle one is green, and the bottom is blue. Notice there is a black line around the edge of each square.

Make the screen 100 pixels wide and 300 pixels high, and each square 100 by 100 pixels. Don't draw any part of the squares go off the screen.

Solution

```
// 2 marks for overall syntax, indentation, style, etc.
void setup() {
  size(100, 300);   // 1 mark for setting the screen size
                    // 1 mark for the correct stroke (default of black)
}

void draw() {
  fill(255, 0, 0);          // 6 marks for correct colors and rectangles
  rect(0, 0, 99, 99);
  fill(0, 255, 0);
  rect(0, 99, 99, 99);
  fill(0, 0, 255);
  rect(0, 199, 99, 99);
}
```

Note: In a midterm exam, we would also be happy if you wrote 100 instead of 99 and 200 instead of 199 in your answer. While writing 100 and 200 would cause the diagram to be off by 1 pixel when run in Processing, the important part of **this** question is the code, and not the exact numeric values.

Debugging

(10 marks) The following program is **supposed** to draw a circle of diameter 50 on the screen centered at the mouse pointer. However, it contains **at least 5 different errors**. Circle five errors *and* show how to fix them.

Note that the program has extra blank lines to give your more space for your answers.

```
Void setup() {

   size(500, 500);


void draw()

   background(0, 0, 0);

   ellipse(mouseX, mouseY, 100, 100)

}
```

Solution:

```
Void setup() {  // Void misspelled: should be void

   size(500, 500);

// missing }


void draw() // missing {

   background(0, 0, 0);

   ellipse(mouseX, mouseY, 100, 100)  // missing ;
                          // should be 50, not 100

}
```

Animation

(10 marks) Write a complete program that makes an image of an airplane bounce around the screen. Let the airplane start in the middle-top of the screen, and move around at a constant speed. When the plane hits an edge, it reverses direction.

Don't worry about keeping the airplane entirely on the screen when it bounces: it's okay if part of it briefly goes off the edge.

Make the screen 500-by-500, and assume that image file `airplane.png` is a folder called `data` in the same folder as the source code for your program.

Solution

```
PImage plane;

float x, y;
float dx, dy;

void setup() {
  size(500, 500);
  plane = loadImage("airplane.png");
  x = 100;
  y = 20;
  dx = 1;
  dy = 1;
}

void draw() {
  background(255);
  image(plane, x, y);
  x += dx;
  y += dy;

  if (x < 0) {
    x = 0;
    dx = -dx;
  }

  if (x >= 500) {
    x = 499;
    dx = -dx;
  }

  if (y < 0) {
    y = 0;
```

```
    dy = -dy;
  }

  if (y >= 500) {
    y = 499;
    dy = -dy;
  }
}
```