CPSC 601.36 - Fall 2009 - L01
Practice Final Exam

November 30, 2009 **Time: 120 minutes**

General instructions:

1. This exam is open-book. You may use any reference material you require, and you may use a laptop computer if you like.
2. There are 3 questions, each worth 10 points, for a total of 30 points possible. Attempt all the questions. All questions will be graded and contribute to your score.
3. Record your answers on the USB memory stick provided. You may also add any other information about your answers in the examination booklet provided. Make sure that your name is printed legibly on the front of the booklet and that your name and ID are on the inside of the booklet before you turn it in.
4. You MUST return the question booklet and the USB memory stick.
5. There are 4 pages in the question book. Make sure you have all the pages before you begin.

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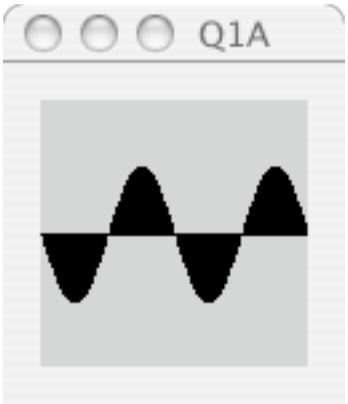
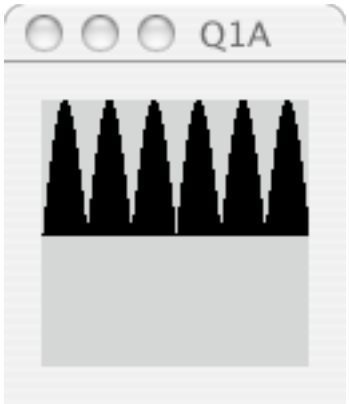
1. [10] Suppose you have the following Processing program.

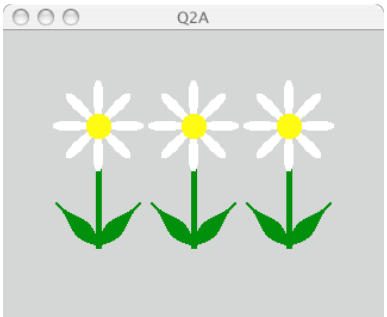
```
noFill();
stroke(0);

for( int x = 0; x < width; x++ ) {
  float y = height/4 *
    sin( map(x, 0, width, 0, 2 * TWO_PI) ) + height/2;
  line( x, height/2, x, y );
}
```

When you run the program, you see this image below on the left, but what you really want to see is the image on the right. Fix the code so that you get the image on the right.



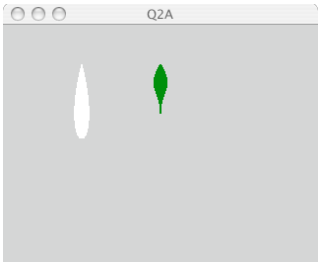


2. [10] Write the function **drawDaisy( )** to complete the program below and draw the picture shown on the right.



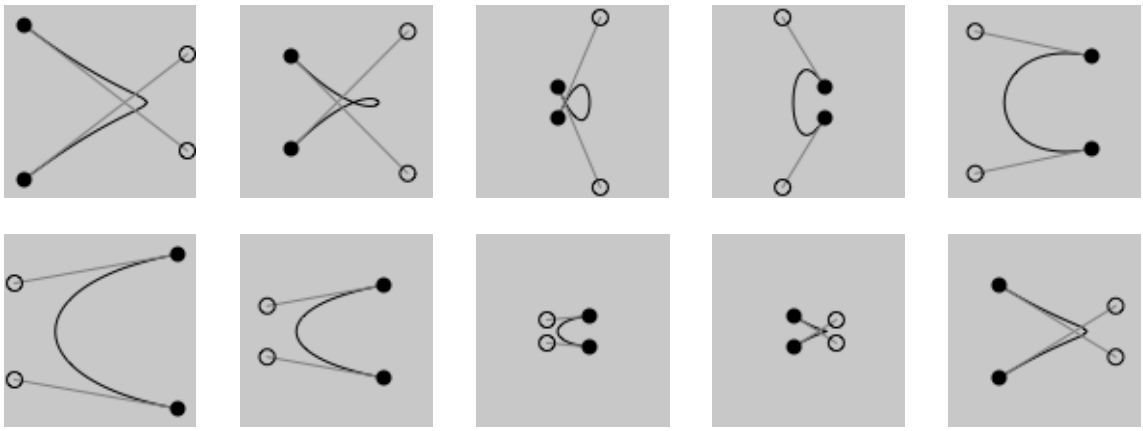

```
void setup() {
  size(320,240);
  for( int x = width/4; x < width; x += width/4 ) {
    drawDaisy( x, 3*height/4 );
  }
  noLoop();
}

void drawDaisy( float x, float y ) {
  // draw a daisy with base at x,y
}

void drawPetal() {
  // draw a white petal at origin
  noStroke();
  fill( 255, 255, 255 );
  bezier( 0, 0,   25, 100,   -25, 100,   0,0 );
}

void drawLeaf() {
  // draw a green leaf at the origin
  noStroke();
  fill( 0, 128, 0 );
  bezier( 0,0,   15,25,  0,25, 0,50 );
  bezier( 0,0,  -15,25,  0,25, 0,50 );
}
```

Your function should use the functions **drawPetal()** and **drawLeaf()**. The **setup()** function below produces the image on the right, demonstrating how to use these functions. Use **translate()**, **rotate()** and **scale()** as needed to produce a facsimile of the image above.




```
void setup() {
  size( 320, 240 );
  translate( 80, 40 );
  drawPetal();
  translate( 80, 0 );
  drawLeaf();
  noLoop();
}
```

3. [10] Complete the following program to draw the moving pattern illustrated below. You should also find a movie in your supplementary material showing your target output. The data for the arrays containing control points for a Bezier curve are given. Your program should draw the Bezier curve, the control points, and the tangent lines between the first and second, and third and fourth control points. The program should loop through the sequence indefinitely.



```
// first control point
float[] x1 = { 10, 26, 42, 58, 74, 90, 74, 58, 42, 26 };
float[] y1 = { 10, 26, 42, 58, 74, 90, 74, 58, 42, 26 };

// second control point
float[] x2 = { 95, 86, 63, 36, 13,  5, 13, 36, 63, 86 };
float[] y2 = { 75, 86, 94, 94, 86, 75, 63, 56, 56, 63 };

// third control point
float[] x3 = { 95, 86, 63, 36, 13,  5, 13, 36, 63, 86 };
float[] y3 = { 25, 13,  6,  6, 13, 25, 36, 44, 44, 36 };

// fourth control point
float[] x4 = { 10, 26, 42, 58, 74, 90, 74, 58, 42, 26 };
float[] y4 = { 90, 74, 58, 42, 26, 10, 26, 42, 58, 74 };

void setup() {
  frameRate(10);
  smooth();
}

void draw() {

}
```