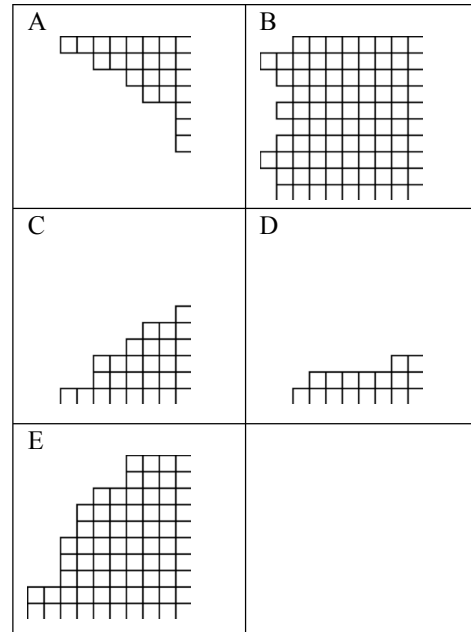


This is a closed notes, closed book exam.

1. Which of the images to the right could be the result of running this program? Check ALL that apply. The apparently incomplete squares are an artifact of being on the edge and not some subtle trick.

```
int boxW = 10, boxH = 10;
void setup() {
  background(255);
  drawGrid();
}
void drawGrid() {
  int rowStart = 0;
  for (int y=(height-boxH)/boxH; y>=0; y--) {
    rowStart = drawRow(rowStart, y);
  }
}
int drawRow(int minX, int y) {
  int rowStart = minX + boxW * (int)random(3);
  for(int x = rowStart; x < width; x=x+boxW) {
    rect(x, y*boxH, boxW, boxH);
  }
  return rowStart;
}
```



2. What does the following program print?

```
int x=5;
void setup() {
  int z = timesTwo(x);
  println(x);
  println(z);
}
int timesTwo(int y) {
  int x = y * 2;
  println(x);
  return x;
}
```

- A. 10, 10, 10
 B. 10, 5, 10
 C. 10, 5, 5
 D. 5, 5, 5

3. What is the start of the first line of output printed by the program to the right?

- A. func1 =
 B. func2 =
 C. func1 x =
 D. func2 x =

4. What is the last number printed by the program to the right?

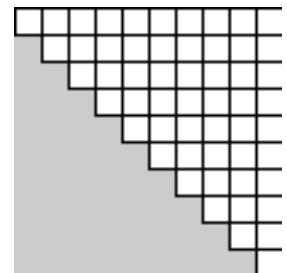
- A. 5
 B. 10
 C. 15
 D. 20
 E. 45

```
void setup() {
  println("func1 = " + func1(func2(5)));
}
int func1(int x) {
  println("func1 x = " + x);
  return 2*x;
}
int func2(int x) {
  int y = func1(x);
  println("func2 x = " + x);
  return y;
}
```

5. Fill in the blanks so this static sketch creates the image on the right.

```
for (int j = 0; j < 100; j = j + 10) {

  for (int i = _____; _____; i = i+10) {
    rect(i, j, 10, 10);
  }
}
```



6. Fill in the blanks so this program creates two balls. ballA should have 0.5 velocities for both x and y and should start at (100,0). ballB should have zero velocity and start at (150,50). They should each be 15 pixels in diameter. They should both have their positions updated and be drawn as specified by the Ball class. Caution: This Ball class is may be slightly different from ones you have already seen. It is not a subtle trick but there are several versions floating around.

```
Ball ballA, ballB;
float gravity = 0.1;

void setup() {
  size(400, 400);

  ballA = _____;

  ballB = _____;
  fill(255,0,0);
}

void draw() {
  background(255);

  _____;

  _____;
}

class Ball {
  float x, y, xVel, yVel;
  int diam;

  Ball(float xStart, float yStart, float xV, float yV, int diameter) {
    x = xStart;
    y = yStart;
    xVel = xV;
    yVel = yV;
    diam = diameter;
  }

  void moveAlong() {
    // check if hit the ground so need to reverse the velocity
    if (y > height-diam/2) {
      yVel = -yVel;
    }
    // adjust position based on velocity
    y = y + yVel;
    x = x + xVel;

    // adjust the velocity - increasing due to gravity
    yVel = yVel + gravity; // always accelerate down

    // add some drag
    yVel = yVel*0.99;

    drawIt();
  }

  void drawIt() {
    // draw the ball
    ellipse(x, y, diam, diam);
  }
}
```