Breakout YEAH

- Foundation Concepts
    - **Constants/ivars/local variables**
        - private static final int BRICK_WIDTH
        - private GOval ball;
        - int 3;
    - **Methods and parameters, passing parameters**

```
private int addTwoIntegers(int a, int b) {
        int sum = a + b;
        Return sum;
}

public void run() {
        int firstInt = 10;
        int secondInt = 10;
}
```

    - **How do I write a method that returns something? How do I store the value that a method returns?**
    - **GraphicsProgram**
        - GObject class
            - object.setColor(color)
            - object.setLocation(x, y)
            - object.move(dx, dy)
        - pause(PAUSE_INTERVAL)
    -

- Breakout demo

- Assignment handout
    - Steps
        - Bricks (just like pyramid, just with colors!)
        - Paddle (mouseListeners)
        - Ball
            - private double vx, vy (x velocity and y velocity)
            - make a random number generator:
                - private RandomGenerator rgen = RandomGenerator.getInstance();
            - vx = rgen.nextDouble(1.0, 3.0);
              if (rgen.nextBoolean(0.5)) vx = -vx;
            - bounce against the top wall—reverse the sign of vy

    - bounce against the side wall—reverse vx
- Check for collisions
    - Suggest writing separate method

```
Private GObject getColliidingObject() {
        For each of the four corner points of the ball
        Call getElementAt to see if anything is there
        if value isn't null, you know that's your gobject
        if you make it through all 4, then return NULL
}
```

            - What did you collide with?

```
If (collider == paddle) {
        Bounce back up
}
```

    - Getting the paddle to track the mouse
        - addMouseListeners()
    - `public void mouseMoved(MouseEvent e) {…}`
- Animate a turn
- Put game together

Odds & ends:

- Terminating conditions—what happens when the ball hits the bottom wall?
- Adjust the speed of the ball
- waitForClick()
- Animation pattern
    - Move/pause
- Debugging
- Extensions