**Discussion 5: Concurrency**

**Concurrency**

1. CS10 has decided to open a pizzeria! To make a pizza, the following tasks must be completed:

<table>
<thead>
<tr>
<th>Task</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make the dough</td>
<td>25 minutes</td>
</tr>
<tr>
<td>Make the sauce</td>
<td>25 minutes</td>
</tr>
<tr>
<td>Prepare the toppings</td>
<td>10 minutes</td>
</tr>
<tr>
<td>Assemble the pizza</td>
<td>10 minutes</td>
</tr>
<tr>
<td>Bake the pizza</td>
<td>50 minutes</td>
</tr>
</tbody>
</table>

a. Which of these tasks must be completed in serial? __________________________

b. Which of these tasks can be completed in parallel? __________________________

c. Based on Amdahl’s Law, how fast can we make a single pizza? ________________

d. How many employees would the pizzeria need to make a pizza this fast? __________

e. Would adding an employee to your answer from part (d) change the time it takes to make a pizza? ________________________________________________________________________

2. Assume we click the green flag to run the code below, then wait 60 seconds. What are all the possible values of magic after 60 seconds have elapsed?

Possible values of magic: ____________________________________________
3. Which of the following could be the value of my_name after the green flag is clicked?

Dan Garcia Dan Bear Garcia Oski Dan BearOski Garcia Dan Oski Dan OskiBear

**Testing**

The following questions are based off this block:

1. We try to test our code, but we get an error. What does it mean and how can we fix it?

2. Now, we try to run the following test, but it doesn’t work as expected:

Why does it output this, and how could we fix it?
3. Assuming we haven’t changed the code for square numbers, what should we expect this block to output? Is it any different from the output from part 2?

![Block diagram showing square numbers test with inputs and outputs.]

**Challenge**

1. List all possible values of grade after the green flag is clicked.

![Block diagram showing actions and calculations for grade, including set, broadcast, when clicked, and when I receive blocks.]

Here are the definitions of the blocks used in the above scripts:

![Block definitions showing apply EPA, get grade, wait, change, and report blocks.]

**Possible values of grade:**

- [ ]
- [ ]