AndrewID: _____

Name: _____

Please place your answers entirely inside the answer boxes. These questions do not use concepts beyond week 8.

Pipelining: You are managing a bakery that makes cakes. You have 1 mixer, 1 oven, and 1 icing tube. The steps to make a cake are:
1. [M] Mix the ingredients for 1 cake together in a bowl, which takes **1 time step**
2. [B] Bake the cake in the oven, which takes **3 time steps**
3. [I] Ice the cake, which takes **2 time steps**

Each of the boxes below indicates what work is happening at each time step t_i.
If there is only **1 worker**, the pipeline for **10 time steps** would look like this:

t_1	t_2	t_3	t_4	t_5	t_6	t_7	t_8	t_9	t_{10}
M	B	B	B	I	I	M	B	B	B

1. How many cakes can the bakery make with 1 worker in 10 time steps? **1**

2. Assume there are **3 workers**, each with **1 job**. In each box below, specify what work is happening at each time step with pipelining. **If the worker is not doing any work, leave the box empty.** We have added the M to indicate the first step for the first cake.

	t_1	t_2	t_3	t_4	t_5	t_6	t_7	t_8	t_9	t_{10}
Mix	M			M			M			M
Bake		B	B	B	B	B	B	B	B	B
Ice					I	I		I	I	

3. With pipelining, how many cakes can the bakery make with 3 workers in 10 time steps? **2**

4. With pipelining, how many time steps does it take to make 4 cakes with 3 workers? **15**