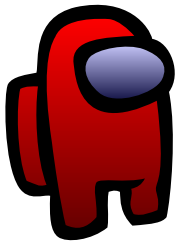
Assignment 03: Amogus



Oh no! There's an imposter *Among Us* 😳

Fortunately for us, we have the power of MATLAB on our side and can *calculate* millions of scenarios to see how likely we are to lose to the imposter. To make sure that we can find out our odds of survival before the imposter kills us, we'll need to vectorize and use our newly learned methods of indexing!

Since it's difficult to model crewmate and imposter behavior, we'll have to make a few simplifications to ensure that we can complete our simulation in time. The rules for our simulation are as follows:

- The imposter's *sus* ability is the sum of two rolls of a two sided die.
- Each crewmate's *sus resistance* is the roll of a four sided die.
- An imposter can kill a crewmate only if their sus ability is greater than the crewmate's sus resistance.
- There is one imposter, six crewmates, and twelve rounds.
- Each round, the imposter will target one crewmate at random. If the crewmate has already been killed or has a greater sus resistance score, nothing happens.
- A loss occurs if one or fewer crewmates remain after the twelve rounds.

To ensure that we have accurate results, we'll run our simulation for a million iterations. Since we're dealing with so many iterations, please include the following starter code to have deterministic results:

```
ITERATIONS = 1e6;

CREWMATES = 6;
ROUNDS = 12;

CREWMATE_SIDES = 4;
IMPOSTER_ROLLS = 2;
IMPOSTER_SIDES = 2;

rng(0x73757300);
```

Here, `rng()` sets MATLAB's random number generator seed so that we can reproduce our calls to random functions.

1. For this part, utilize `randi()` to generate matrices for our "random" events. Create a `crewmates` matrix with each crewmate's sus resistance, a `sus` matrix with the imposter's sus ability, and a `targets` matrix with the imposter's target for each round.

   Hint: For each random event, add a dimension.

   Hint: For the sus ability, add a dimension for rolls and `sum()` across it.

2. Now generate a logical `kills` matrix that will represent all crewmates, the imposter can that can kill in twelve rounds.

   Hint: The `targets` matrix contains the crewmate the imposter will target. You can treat the crewmate and the round as a subscript index. If you convert these to linear indices, you can easily create this logical matrix given an initial `false()` matrix.

3. Now, create a logical `survivors` matrix with all the crewmates that evaded the imposter.

4. Finally, calculate the `loss_rate` given the `survivors`. If you did everything correctly, this should equal `0.1174`.

Aside— While working through this assignment, feel free to modify the simulation parameters to smaller values to make it easier to debug and visualize.

