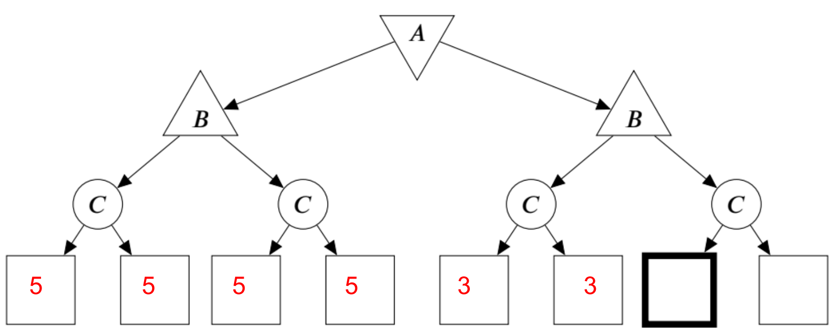
1. State space
    1.1. I would use a graph to represent the state space of the search problem - the nodes would represent a possible position of the two flies, and each edge would represent a possible move each of the flies can do.
    1.2. For a maze that is M x N, there are M * N possible positions for each fly. There are two flies, so there are $(M * N)^2$ possible combinations with two flies. If we consider that there should be no possible state when the two flies are on the same block (the game will have ended), we get $(M * N)^2 - (M * N)$ combinations.

2. General Search
    2.1. S-G
    2.2. S-C-G
    2.3. S-A-B-D-G
    2.4. S-C-G
    2.5. Heuristics
        2.5.1. h1 is admissible, all h(n) values are less than or equal to the true cost to get to the goal. The closest value is h(C) which is 6, and the true cost is 6, but it is still less than or equal to the true cost.
        2.5.2. h1 is not consistent. Not all heuristic "arc" costs are less than or equal to the actual arc cost - ex. S-A cost is 1, but h(S) - h(A) = 7 - 5 = 2. 2 is not less than or equal to 1, so h1 is not consistent.
        2.5.3. h2 is admissible, all h(n) values are less than or equal to the true cost to get to the goal.
        2.5.4. h2 is consistent. If you find the values of every arc, of the difference in heuristic values of the two states between is less than or equal to the actual cost on the graph.

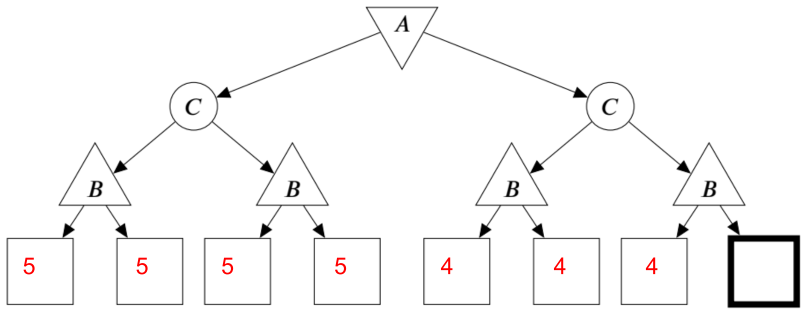
3. Multi-agent Search
    3.1. Node P: (2*0.2) + (1*0.2) + (3*0.2) + (-1*0.2) + (0*0.2) = 1
    3.2. Node Q: (2*0.2) + (2*0.2) + (1*0.2) + (-1*0.2) + (-2*0.2) = 0.4
    3.3. Node R: (1*0.2) + (2*0.2) + (-3*0.2) + (4*0.2) + (-2*0.2) = 0.4
    3.4. Node S: max(1, 0.4, 0.4) = 1
    3.5. Alyssa should bid x_1 for the bike

4. Alpha-Beta
    4.1.



For the left side of the minimizer A, B will always be equal to 5. For the left side, we see that B will be at least 3. If the bolded node is 5 or more, the minimizer A will be equal to 5, however if the bolded node is less than 5, the minimizer A may not be equal to 5 (depending on the next node). Because the bolded node can change the value of the minimizer, we know that it cannot be pruned.

4.2.



For the left side of the minimizer A, C will always be equal to 5. For the right side, the first maximizer B will always equal 4. The next maximizer will be 4 if the bolded node is less than or equal to 4. If the bolded node is more than 4, the maximizer will be equal to that value and the chance node could be more than 5. This would mean that the value of the minimizer A depends on whether the chance node is more or less than 5 (the value on the right side). Thus, the bolded node matters and cannot be pruned.