HW 5 SUNID BENMA

1a multiagent Pacman finds the min of all agents, it will handle when the depth is not where max or min kicks in.

$$V_{minimax}(s,d) = \begin{cases} Utility(s) & \text{if } IsEnd(s) \\ Eval(s) & \text{if } d=0 \\ \max_{a \in Actions(s)} V_{minimax}(Succ(s,a),d) & \text{if } Player(s)=a_0 \\ \min_{a \in Actions(s)} V_{minimax}(Succ(s,a),d) & \text{if } Player(s)=a_1,a_2,a_3 \cdots a_{n-1} \\ \min_{a \in Actions(s)} V_{minimax}(Succ(s,a),d-1) & \text{if } Player(s)=a_n \end{cases}$$

3a. In this case, we need to average the legal moves and sum the product of that average

$$V_{expmax}(s,d) = \begin{cases} Utility(s) & \text{if } IsEnd(s) \\ Eval(s) & \text{if } d=0 \\ \max_{a \in Actions(s)} V_{max}(Succ(s,a),d) & \text{if } Player(s)=a_0 \\ \frac{1}{|Actions(s)|} \sum_{a \in Actions(s)} V_{max}(Succ(s,a),d) & \text{if } Player(s)=a_1,a_2,a_3 \cdots a_{n-1} \\ \frac{1}{|Actions(s)|} \sum_{a \in Actions} V_{max}(Succ(s,a),d-1) & \text{if } Player(s)=a_n \end{cases}$$

4b. Eval function for features of Distance, food, capsicles and ghosts

1. Distance to food, get a negative coefficient (-)
2. Distance to ghost, get a positive coefficient (+)
3. Num of food and capsules left, get a negative coefficient (-)
4. Distance to scared ghost, get a positive coefficient (+)
5. Reciprocal of turns of ghost is important

We tried

1. change the weight of Distance coefficient — worked
2. different score model —— worked
3. pacman and ghost's locations / positions - not work
4. different ghost's scared time — worked