Ex6 – answers file

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Part b:

```
class ColorBasedAgent(Agent):
    def __init__(self, alpha=0.2):
        """
        Constructor
        Initiation of memory parameters and alpha
        """
        super().__init__()
        self.stats_table = {}
        self.last_choice = None
        self.last_color = None
        self.alpha = alpha

    def make_decision(self, left_color, right_color):
        """
        Make decision
        """
        if left_color not in self.stats_table:
            self.stats_table[left_color] = 0.5
        if right_color not in self.stats_table:
            self.stats_table[right_color] = 0.5

        if self.stats_table[left_color] == self.stats_table[right_color]:
            self.last_choice = np.random.choice([0, 1], 1, p=[0.5, 0.5])[0]
        elif self.stats_table[left_color] > self.stats_table[right_color]:
            self.last_choice = 0
        else:
            self.last_choice = 1

        if self.last_choice == 0:
            self.last_color = left_color
        else:
            self.last_color = right_color

        return ["left", "right"][self.last_choice]

    def get_reward(self, reward):
        """
        Get reward
        """
        self.stats_table[self.last_color] = self.get_probability(reward)

        if self.stats_table[self.last_color] < 0:
            self.stats_table[self.last_color] = 0
        elif self.stats_table[self.last_color] > 1:
            self.stats_table[self.last_color] = 1

    def get_probability(self, reward):
        """
        Get probability
        """
        return (1 - self.alpha) * self.stats_table[self.last_color] +
self.alpha * reward
```

1. Analysis:

Agent	Max	Average
RandomAgent	20	-0.58
ComparingColorsAgent	88	59.28
ColorBasedAgent	96	68.64

The random agent is the worst agent, that because there is no making decision process.

The color-based agent is the best agent. That because the agent keeps the probability of each color on his memory, not like the comparing color agent, which learn the probability of couple of colors, and not each one individually and because of this the probability is less accurate.

2. Plot of ColorBasedAgent result average with alpha value from 0 to 1 (0, 0.1, 0.2, …, 1)