

Assignment 2

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Part 1:

a.) State Set:

$\{s_1, s_2, s_3, s_4, s_5, s_6, s_7, s_8, s_9, s_{10}, s_{11}, s_{12}\}$

s_1 is the starting state and s_{12} is the terminal state.

b.) State Info:

Each state represents an island with two attributes (N, t) :

N : The name of the island (a string)

t : "treasure" if there is treasure, or "none" if there isn't

$s_1 = ("Port", "none")$

$s_2 = ("Happy", "none")$

$s_3 = ("Shadow", "none")$

$s_4 = ("Sandy", "none")$

$s_5 = ("Barren", "treasure")$

$s_6 = ("Cozy", "none")$

$s_7 = ("Starry", "treasure")$

$s_8 = ("Rocky", "none")$

$s_9 = ("Scorched", "none")$

$s_{10} = ("Sacred", "treasure")$

$s_{11} = ("Kraken", "none")$

$s_{12} = ("Destination", "none")$

C.) Set of Actions

Let all possible actions be defined by the set:

$$A = \{ \text{"dig"}, \text{"move"} \}$$

d.) Gamma

$$\gamma = 0.95$$

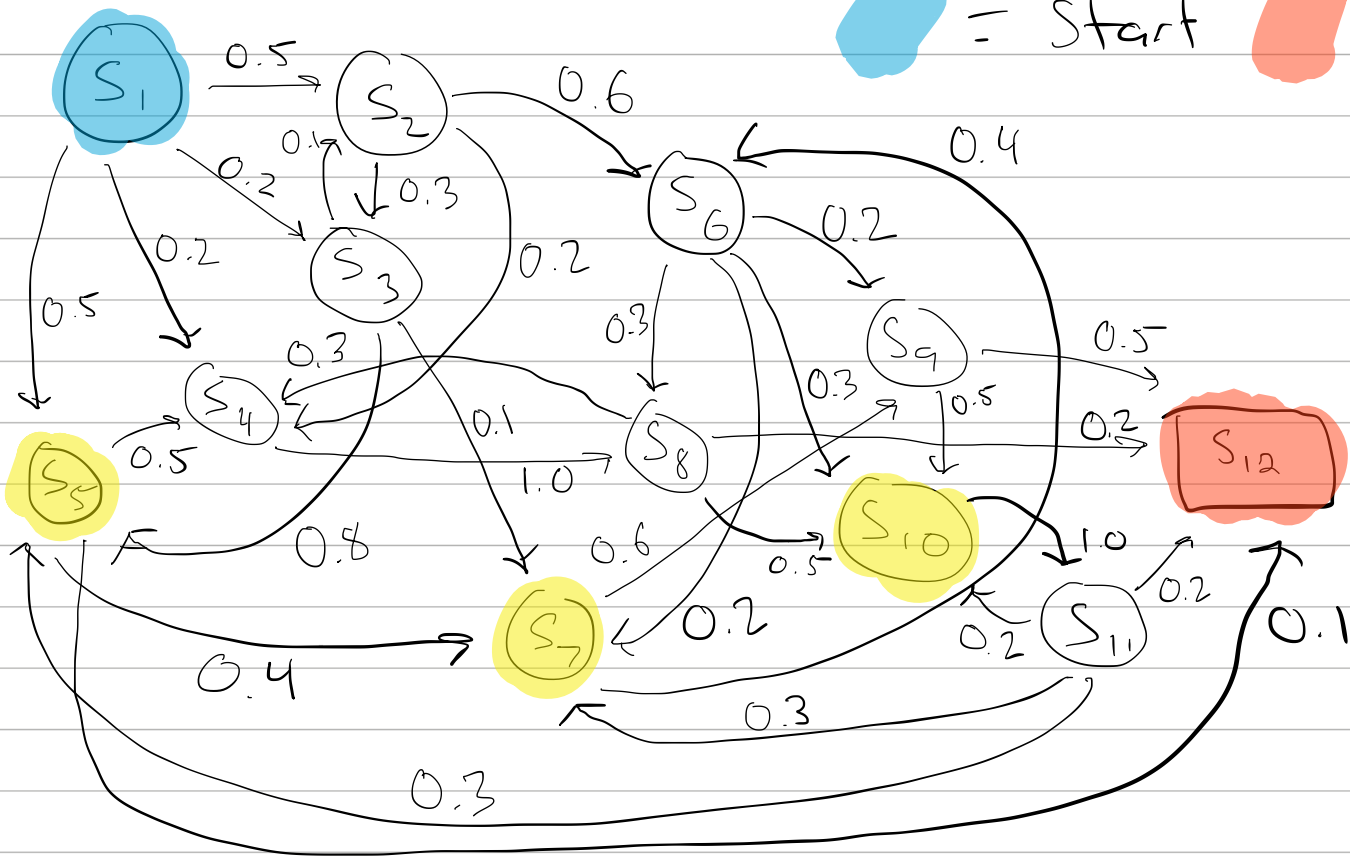
e.) State Transition Probability Matrix

[illegible]

Markov Chain:

 = treasure

 = start = end



f.) Reward Function

reward at start = 0

t = time step
 $\gamma = 0.95$

a.) action "move": $\text{reward} -= 1\gamma^t$

b.) action "dig" and finding treasure: $\text{reward} += 2\gamma^t$

c.) action "move" to S_{12} : $\text{reward} += 5\gamma^t$

d.) action "move" to S_{12} with all treasure: $\text{reward} += 15\gamma^t$

PART 2

- 1.) Agent s_1 is a traveler that starts on
- 2.) Policy:
 - 100% chance to travel
 - i.) travel to an island that can be reached and increment time-step
 - ii.) 10% to dig. If digging occurs, increment time-step
 - iii.) Repeat i and ii until s_{12} is reached or time-step equals 25