

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

$s_1 = (\text{"Port"}, \text{"none"})$

$s_2 = (\text{"Happy"}, \text{"none"})$

$s_3 = (\text{"Shadow"}, \text{"none"})$

$s_4 = (\text{"Sandy"}, \text{"none"})$

$s_5 = (\text{"Barren"}, \text{"treasure"})$

$s_6 = (\text{"Cozy"}, \text{"none"})$

$s_7 = (\text{"Starry"}, \text{"treasure"})$

$s_8 = (\text{"Rocky"}, \text{"none"})$

$s_9 = (\text{"Scorched"}, \text{"none"})$

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

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

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

C.) Set of Actions

Let all possible actions be defined by the set:

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

d.) Gamma

$$\gamma = 0.95$$

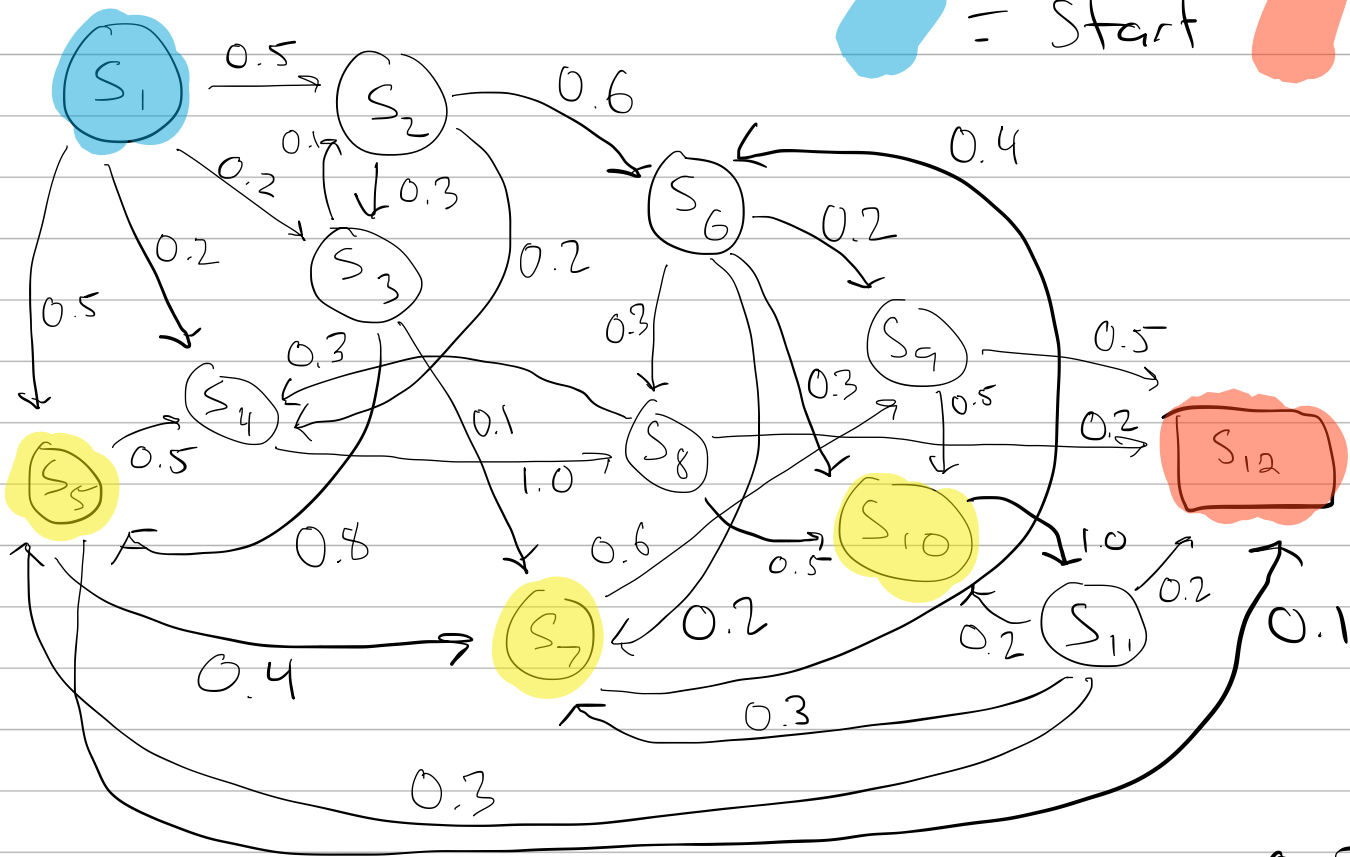
e.) State Transition Probability Matrix

[illegible]

Markov Chain:

 = treasure

 = start = end



f.) Reward Function

reward at start = 0

→ 0-24
t = time step
 $\gamma = 0.95$

a.) action "move": reward = $1\gamma^t$

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

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

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

PART 2

1.) Agent is a traveler that starts on s_1

2.) Policy:

i.) At each timestep, perform an action:

→ a.) 90% chance to travel to a connected or island using the probability matrix

↳ b.) 10% chance to dig for treasure at the current island. If treasure is found it can no longer be found at that island.

ii.) increment timestep and repeat until s_{12} is reached or the timestep reaches 25.