

OCEAN SIMULATION

CENG 4513 - Modelling and Simulation Project



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INTRODUCTION

Ocean simulation aims to simulate an ecosystem which has three kind of underwater creature. Those are whale, angler fish and seaweed. Main purpose of the simulation is find the lifetime of ecosystem which changes according to inputs which declared by user.

MODEL

Ocean simulation has powered by HTML5 game engine called [Quintus](#). At the beginning, app asks variables which are given below to initialize environment.

- Month per second: In a second, how many month is passed.
- *Whale variables:*
 - *Initial population*
 - *Average lifetime as a month*
 - *Breeding frequency as a month*
 - *Average number of babies*
 - *Probability of being healthy for each baby*
 - *Nutrition per month*
- *Angler fish variables:*
 - *Initial population*
 - *Average lifetime as a month*
 - *Breeding frequency as a month*
 - *Average number of babies*
 - *Probability of being healthy for each baby*
 - *Nutrition per month*
- *Seaweed variables:*
 - *Initial population*
 - *Breeding frequency as a month*
 - *Average number of babies*
 - *Probability of being healthy for each baby*

TEST RESULTS

	Whale	Angler Fish	Seaweed
Initial Population	1	10	100
Average Lifetime	14	25	-
Breeding Frequency	8	5	5
Average Number of Babies	2	2	1
Probability of Healthy Baby	0.8	0.8	1.0
Nutrition per Month	1	1	-
Month per Second	1	RESULT	28 month

14 healthy whale had borned

2 whale had dead because of hunger

3 whale had dead because of lifetime

142 healthy angler had borned

152 had eaten by whale

0 angler had dead because of hunger

0 angler had dead because of lifetime

1741 seaweed had breeded

743 seaweed had eaten by angler

	Whale	Angler Fish	Seaweed
Initial Population	1	10	100
Average Lifetime	14	25	-
Breeding Frequency	8	5	4
Average Number of Babies	2	2	1
Probability of Healthy Baby	1.0	0.8	1.0
Nutrition per Month	1	1	-
Month per Second	1	RESULT	24 months

14 healthy whale had borned
 2 whale had dead because of hunger
 3 whale had dead because of lifetime
 106 healthy angler had borned
 116 had eaten by whale
 0 angler had dead because of hunger
 0 angler had dead because of lifetime
 6483 seaweed had breeded
 541 seaweed had eaten by angler

	Whale	Angler Fish	Seaweed
Initial Population	1	10	40
Average Lifetime	14	100	-
Breeding Frequency	8	5	3
Average Number of Babies	2	2	1
Probability of Healthy Baby	1.0	0.8	1.0
Nutrition per Months	1	1	-
Month per Second	1	RESULT	21 months

6 healthy whale had borned
 0 whale had dead because of hunger
 1 whale had dead because of lifetime
 131 healthy angler had borned
 70 had eaten by whale
 31 angler had dead because of hunger
 0 angler had dead because of lifetime
 499 seaweed had breeded
 539 seaweed had eaten by angler