

**TECHNOLOGICAL UNIVERSITY DUBLIN**

# Simulating the Sharks and Fishes problem in a Parallel Computing Environment

# individual report

by

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# a) The role within the team

I was one of the programmers in the project as well as making zoom meetings. During the meeting, we discussed the project objective. I was one of the project managers, making sure that we were making the right decisions, also sending messages to the group chat to remind everyone what we needed to be done before the deadline and reminding them about the meetings. We have assigned tasks to each other, each week that needed to be done so that each member of the group can have their part of the project started as early as possible and finish it.

# b) A detailed account of the work undertaken by you

The first time we met we introduced ourselves, we had no idea where to begin, in our first meeting, we discussed the project objective and we read through the Project Description, the first thing I did was I researched questions and materials about the project rather than starting to code it, I took notes about the rules, in the second meeting we discussed writing pseudocode instead of starting to write the programs after that I was one of the project managers, assigned everyone tasks to try and do.

I did the main program which is called sharks\_ fish, I didn’t start coding the main program straight away I wrote pseudocode on paper after that I started writing the code in c, I created a new function called sharks\_ fish, I created a 2-dimensional array and I created rows and columns variable then I have created two for loops for the rows and columns, I also created a counter for sharks and fish, sharks baby and fish baby which keep track of the number of sharks and fish in each generation.

I created a number of generations for the program and the number of times it goes through the array. I created the call function to randomly generate a new ocean and I also created the seed the random number of the generator so that we could get different numbers each time we run the program. I created an else if statement if any number that’s greater than 2 and less than 11, increment adult fish by 1, else if any number that’s greater than 12 and less than 30, increment adult shark by 1, else if any number that’s less than 3 and greater than 0, increment baby fish by 1, else if any number that’s less than 13 and greater than 10, increment baby shark by 1 and I created printf () function to print out the number of sharks and fish in each generation.

I have created separate c files. I have created the header.h file and the Makefile to make it more manageable. Instead of putting all the functions in one file

I was one of the programmers who wrote the visualization code, and we used the serial program, changed it into java. we then created the GUI using the JFrame and added the paint method that allowed us to paint on the screen. For the paint, I used different colors to represent the sharks and fish, empty, I have created the an else if statement, if any number that’s greater than 0 and less than 3 , g.setcolor(color.yellow) which is represented by fish , else if any number that’s greater than 2 and less than 11 , g.setcolor(color.yellow) which is also represented by fish , else if any number that’s greater than 10 and less than 13 , g.setcolor(color.red) is represented by shark. Else if any number that is greater than 12 and less than 31, g.setcolor(color.red) is represented by sharks also . else, g.setcolor(color.black) is represented by empty.

I also created array cells static int Cells [] [] = new int [n][n] and the rows and columns variables static int i and static int j and I created a counter for sharks and fish and so on, static int sharks and static int fish, static int sharks baby and static int fish baby, those are the global variables.

# c) A critical review of the input and work undertaken by all team members

I am happy about how the project went but there are few areas that we needed to be worked on, if we had more time, we would get the parallel program working correctly, everyone in the team did their part in the project and had implemented some of c programming for serial and parallel, also visualisation application in java and they put in their effort and hard work, we worked as a team, everyone showed up for the meetings during our project. each teammate showed respect for the other person’s opinions and no one talked over each other when one person was talking instead everyone listened and we communicated well.

# e) A summary of what you have learned from the project, what you might have done differently, and any other general recommendations

I learned a lot from the project and working with the team, I learned how to communicate and work with the members of the team and I had improved on some of my skills and I have learned new skills, I improved my knowledge on the c programming language.

At the beginning of the module, I did know a bit about c programming from last year then when we start the labs and the project, I learned c programming well.

Since the project is based on c programming, I learned how to write c programming and I also learned how to use pointers and many more. I learned how to create multithreads using pthread and I learned a lot this year than I did last year, I have understood the main concept of parallel computing.

What I could have done differently was that to add a counter on visualization to see how many sharks and fish are there in each generation, but we didn’t have enough time to do that and also if we had enough time, we could parallelize our code and compare the performance with the serial.