COP5615-Distributed-Systems: Project 1

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Group Members -

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README

1. Size of the work done and distribution strategy -

   We have used 10 actors to distribute the work that has been provided in the input. We distribute the tasks by dividing the given numbers by 10 so that each actor gets to work on (input/10) numbers. If the input number is less than 10, we have designed the program in a way that one actor can handle all of the tasks.In this way, we have seperated the mechanism for larger numbers and smaller numbers. This task is handled by the boss actor. In this way the program utilizes all the 4 machine cores and 8 logical cores.

   if input < 10:
   1 actor handles everything
   else:
   10 actors are spawned and work is distributed

   Determination of the subproblems -

   When the boss actor is called by the main program, it takes the input and window size as a parameter. On getting these values, it creates a separate message for each of the worker actors which determines the values obtained by doing input/10. These worker actors are spawned immediately and start performing their work concurrently. So, if n = 10,000 the actors will get the chunk of work in the following way-

   - Actor1 - 1 .. 1000
   - Actor2 - 1001 .. 2000
     | | |
   - Actor10 - 9001 .. 10,000

   In this way all the actors are working on equal amounts of numbers.

2. The result for running the program for 1000000 and 4 -

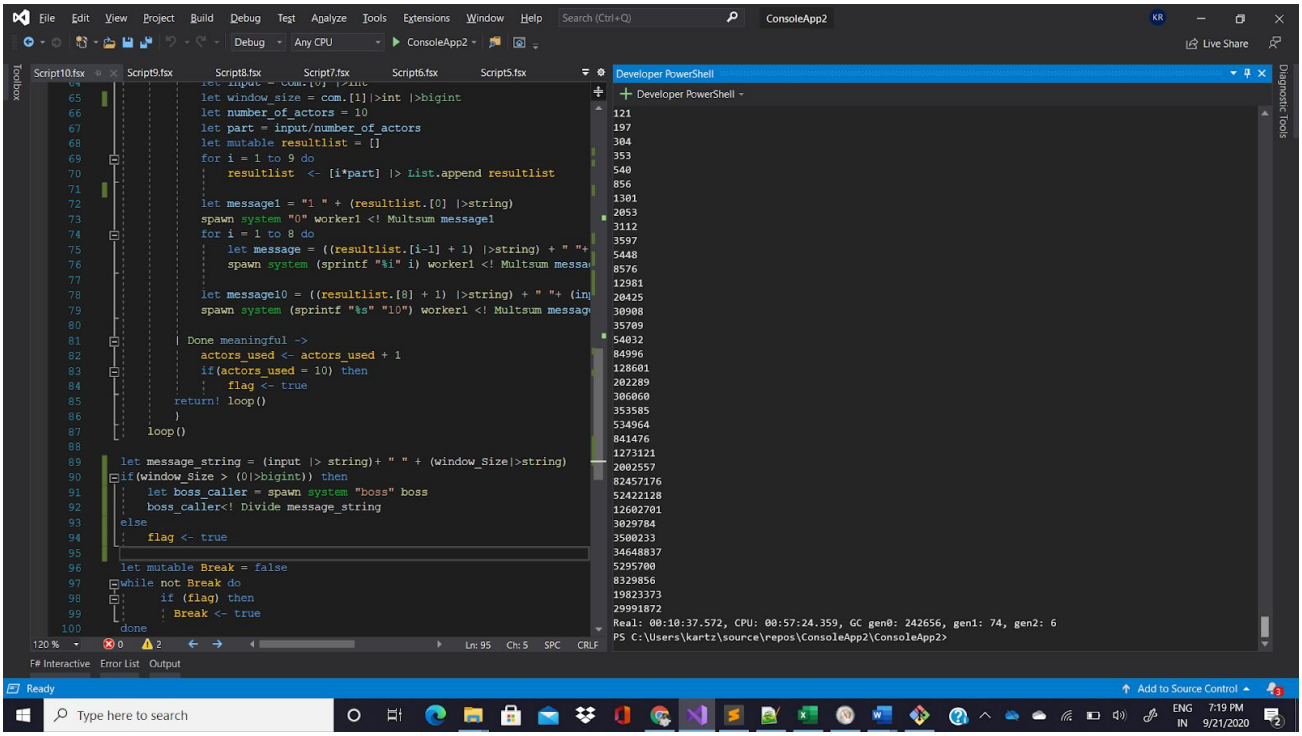
   Running the above test case did not return any value for a lucas square number

3. The running time for 1000000 and 4 is -

   Real - 00:00:02.320 CPU - 00:00:10.359

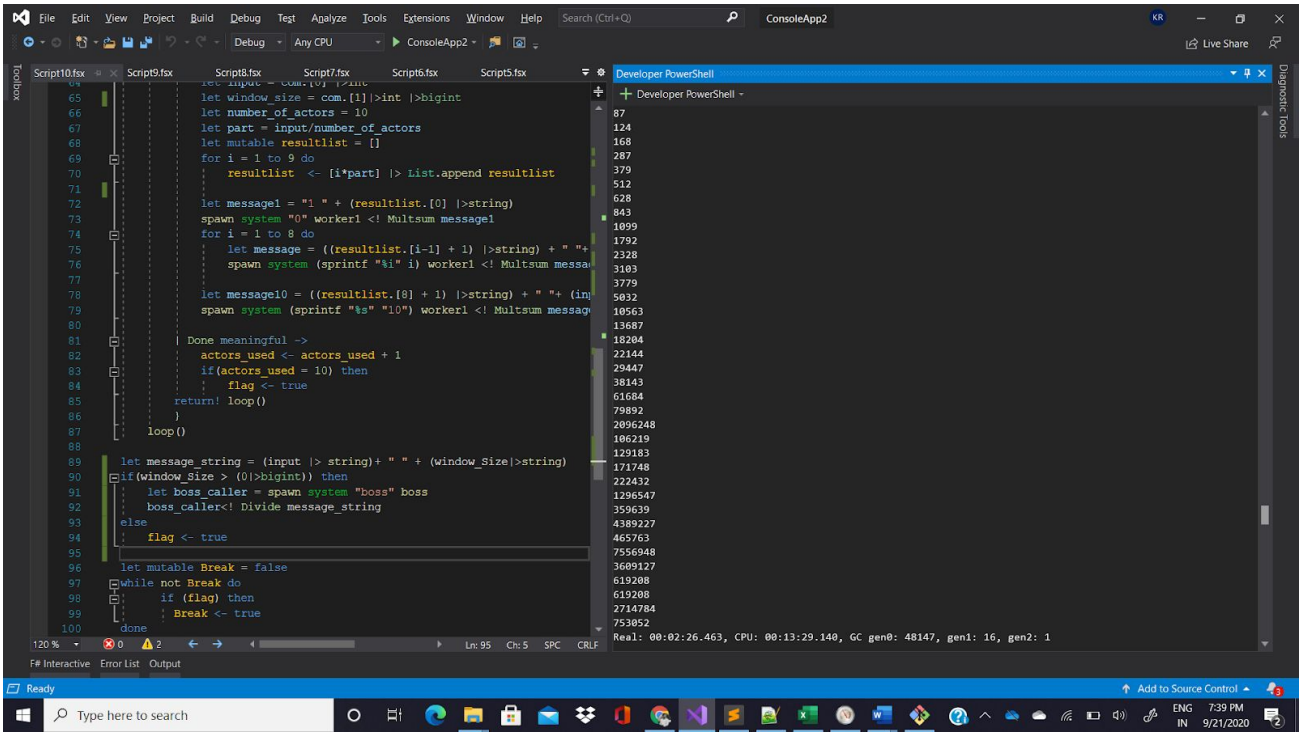
For this input we are getting CPU time/Real time as approximately 5 which tells us we have effectively used 5 cores for our computation. When we increase the number, the core utilization increases.

4. The largest problem that we managed to solve was -
   n = 100000000 and k = 24



Real - 00:10:37.572 CPU - 00:57:24.359 where the CPU time/Real time gives us approximately 6 cores for our computation.

5. Example:
   n = 10000000 and k = 50



Real - 00:02:26.462 CPU - 00:13:29.143 where the CPU time/Real time gives us approximately 6.5 cores for our computation.

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Instructions to run:

1. Unzip the file
2. Run the project using:
   - *dotnet fsi --langversion:preview proj1.fsx input1 input2*

if your system is running a language version lower than 5.0.