HOMEWORK 4

APOSTOLOPOULOU IOANNA

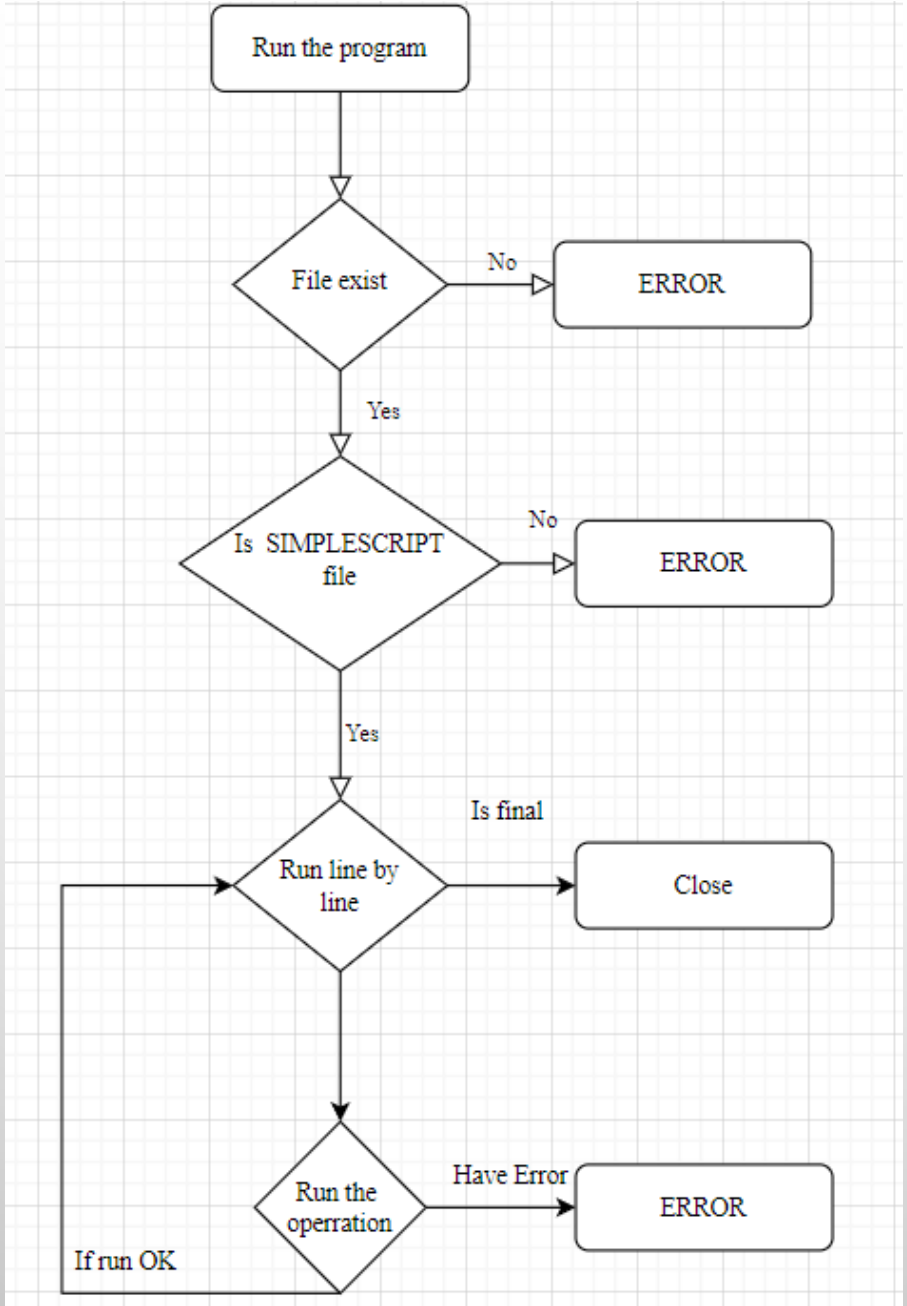
TOLOUDIS PANAGIOTIS

ENVIRONMENT

- RUN
  - RUNS PROGRAMS REQUESTED AND PLACES THEM IN GROUPS
- LIST
  - PRINTS ALL RUNNING PROCESSES AND THREADS AT THE MOMET IN THE WORKSPACE
- KILL
  - KILLS ALL PROCESS IN GROUP REQUESTED
- MIGRATE
  - TAKES A PROCESS FORM 1 MACHINE TO ANOTHER BY SENDING ITS DATA OVER NETWORK
- HELP
  - PRINTS INSTRUCTIONS ON HOW TO USE OUR WORKSPACE

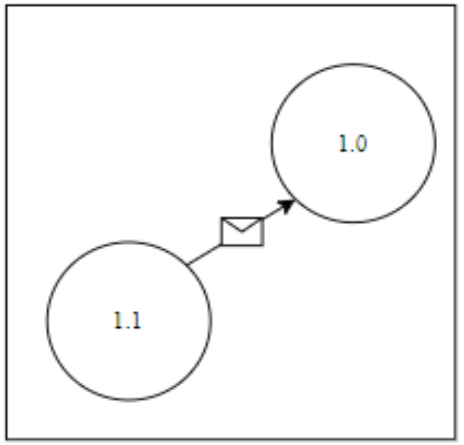
PARSER

- OPENS FILES REQUESTED TO RUN
- CHECKS FROM LINE 0 TO END OF FILE FOR SYNTAX ERRORS
  - IF SYNTAX ERRORS ARE FOUND TERMINATES THE PROCEDURE.
  - IF LOOP IN LABELS IS DETECTED, EXITS THE RUNING PROGRAM WITH ERROR CODE.

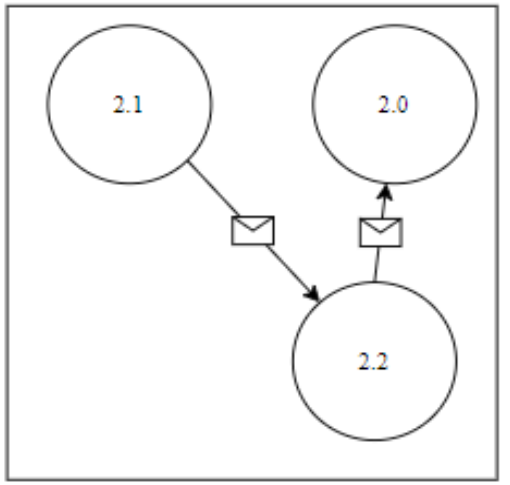

Run the program
File exist
No
ERROR
Yes
Is SIMPLESCRIPT file
No
ERROR
Yes
Is final
Run line by line
Close
Run the operration
Have Error
ERROR
If run OK

MACHINE 1

Group 1

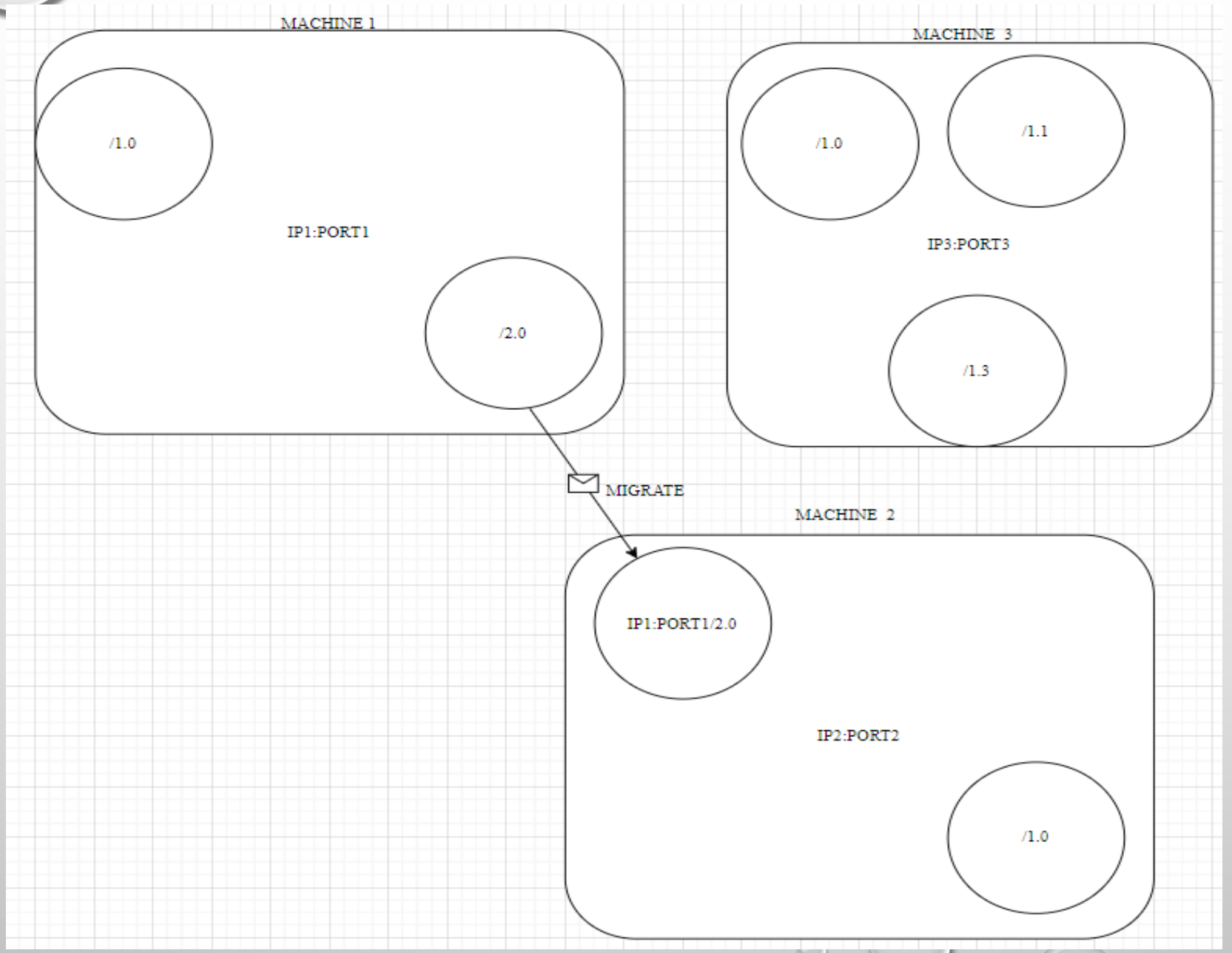


Group 2



MIGRATION

- THE MIGRATION FROM ONE MACHINE TO OTHER IS DONE BY :
  - TCP/IP PROTOCOL
  - USER DEFINES THE IP AND PORT FOR THE NEW HOST MACHINE
- MESSAGES SENT BETWEEN MENBERS OF THE SAME GROUP IN WHICH SOME PROCESSES MIGRATED INTO OTHER MACHINE :
  - FIND THE MACHINE THAT HOSTS THE PROCESS BY USING MULTICAST
  - SENDS MESSAGE OR DATA OVER TCP/IP PROTOCOL


MACHINE 1
/1.0
IP1:PORT1
/2.0
MACHINE 3
/1.0
/1.1
IP3:PORT3
/1.3
MIGRATE
MACHINE 2
IP1:PORT1/2.0
IP2:PORT2
/1.0

LOAD BALANCE (THEORETICALLY)

- 1 MACHINE IS DEFINED AS THE CO-ORDINATOR
  - SENDS A MULTICAST REQUEST TO EVERY ACTIVE MACHINE RUNING THE WORKSPACE ASKING FOR THEIR LOAD
  - WHEN DATA ARE COLLECTED PLACES THEM INTO A GLOBAL DISTRIBUTED BUFFER THAT EVERY MACHINE HAS ACCESS TO
  - BUFFER IS CONSISTED OF THE NAME_OF_MACHINE (IP.PORT) AND THE COUNTER OF LOAD
  - SUM OF LOADS IS CALCULATED
  - AND THEN THE AVERAGE NUMBER OF PROCESSES PER MACHINE IS CALCULATED
- THEN THE CO-ORDINATOR INFORMS EACH MACHINE OF THE MIGRATIONS NEEDED TO BE DONE SO IT IS BALANCED

PROBLEMS DETECTED IN DISTRIBUTED LOAD BALANCE

- WHO CAN BE THE CO-ORIDINATOR ?
- HOW CAN WE ELECT CO-ORDINATOR BETWEEN MACHINES THAT CAN BE ALL AROUND THE GLOBAL NETWORK AND NOT IN A SPECIFIC GROUP ?
- IF A RANDOM MACHINE DECIDES TO SEND MULTICAST REQUEST, BECAUSE THE SYSTEM IS NOT SYNCHRONOUS 2 OR MORE MULTICASTS CAN BE HAPPENING SIMULTANEOUSLY AND DICTATED MIGRATIONS MIGHT VARY
- WHAT IS THE T(MAX) WE SHOULD WAIT FOR REPLIES OF MULTICAST?
- HUGE OVERHEAD DUE TO CONTINIOUS UPDATES OF LOAD_BUFFER

PROBLEMS DETECTED IN DISTRIBUTED LOAD BALANCE

- WHAT IF WE DO NOT UPDATE THE LOAD_BUFFER AND INFO DO NOT CORRESPOND AT THE SPECIFIC TIME?
- ASYNCHRONOUS CLOCKS == WRONG LOAD ?

References:

https://www.researchgate.net/publication/342709018_LOad_balancing_research_paper

https://www.sciencedirect.com/science/article/pii/S131915782100046X

https://arxiv.org/abs/2007.07515