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Principle of Programming Language

Assignment 3

**Program Description**

This program is written in the Julia, which is new modern language. In this programming assignment you will create a Julia program that reads text file. We wrote Julia program to compute the Spider Man numbers of a set of Marvel characters. Specifically, the program should take as input an arbitrary number of Marvel characters – either as integer indexes (easiest) or strings – and for each of these characters, print the character’s name and their Spider Man number. This programming is running file and I have declared here the output of my program. Also plot.png is created after executing program.

------------------------------------------------------------------

**Sources**

Since the 1st part of the Julia code was given to us. Tutorials given in class were my biggest source here. I have learnt how to execute on the paper and learnt from Google how to apply Julia program. I have downloaded Julia pro and used atom to run jl files. I have created one folder and there I have saved given files.

* Here is the given code by professor:

function read\_network(pathname)

# Reads the ith vertex from file

function read\_vertex(i, file)

m = match(r"""^([0-9]\*)\s\*"(.\*)"$""", readline(file))

if parse(Int, m[1]) != i

error("Vertex number $i does not match expected number $line[1]")

end

return m[2]

end

# Process the input file

open(pathname) do file

# Read the \*Vertices line

parsed = split(readline(file))

if parsed[1] != "\*Vertices"

error("Missing \*Vertices line")

end

nvertices = parse(Int, parsed[2])

ncharacters = parse(Int, parsed[3])

ncomics = nvertices - ncharacters

# Read vertices - characters and comics

characters = [read\_vertex(i, file) for i = 1:ncharacters]

comics = [read\_vertex(i, file) for i = ncharacters+1:nvertices]

# Read \*Edgeslist line

if readline(file) != "\*Edgeslist" then

error("Missing \*Edgeslist line")

end

# Read the edges - appearances

appearances = spzeros(Int, ncharacters, ncomics)

while !eof(file)

parsed = split(readline(file))

character = parse(Int, parsed[1])

for i = 2:length(parsed)

comic = parse(Int, parsed[i]) - ncharacters

appearances[character, comic] = 1

end

end

return characters, comics, appearances

end

**Specifics**

I have modified the given file to get the output according to the requirement. In this programming assignment, we want to develop a Julia program to compute the Spider Man number for any arbitrary Marvel character.

* This is the modified code by me.

function read\_network(pathname)

# Reads the ith vertex from file

function read\_vertex(i, file)

m = match(r"""^([0-9]\*)\s\*"(.\*)"$""", readline(file))

if parse(Int, m[1]) != i

error("Vertex number $i does not match expected number $line[1]")

end

return m[2]

end

# Process the input file

open(pathname) do file

# Read the \*Vertices line

parsed = split(readline(file))

if parsed[1] != "\*Vertices"

error("Missing \*Vertices line")

end

nvertices = parse(Int, parsed[2])

ncharacters = parse(Int, parsed[3])

ncomics = nvertices - ncharacters

# Read vertices - characters and comics

characters = [read\_vertex(i, file) for i = 1:ncharacters]

comics = [read\_vertex(i, file) for i = ncharacters+1:nvertices]

# Read \*Edgeslist line

if readline(file) != "\*Edgeslist" then

error("Missing \*Edgeslist line")

end

# Read the edges - appearances

appearances = spzeros(Int, ncharacters, ncomics)

while !eof(file)

parsed = split(readline(file))

character = parse(Int, parsed[1])

for i = 2:length(parsed)

comic = parse(Int, parsed[i]) - ncharacters

appearances[character, comic] = 1

end

end

return characters, comics, appearances

end

end

#const SPIDEY = 5306

function spidey\_numbers(collaborations)

ncharacters = size(collaborations, 1)

nums = fill(-1, ncharacters)

#const SPIDEY = 5306

C = collaborations^0

for i = 0:6

for j = 1:ncharacters

if nums[j] == -1 && C[5306, j] > 0

nums[j] = i

end

end

C \*= collaborations

end

return nums

end

"""

The main program for the Marvel universe assignment. In this hint version it

reads the Marvel universe network from the file "porgat.txt" and prints some

simple statistics to make sure the file was properly read. Then it computes

the collaboration matrix.

"""

function main()

# Read the network

println("Reading Marvel universe network")

characters, comics, appearances = read\_network("porgat.txt")

ncharacters = length(characters)

ncomics = length(comics)

# Print some statistics

println("Number of characters = $ncharacters")

println("Number of comics = $ncomics")

nappearances = sum(appearances)

@printf("Mean books per character = %0.2f\n", nappearances / ncharacters)

@printf("Mean characters per book = %0.2f\n", nappearances / ncomics)

# Compute books per character histogram

println("Plotting books per character histogram")

let x = 1:ncharacters, y = [sum(appearances[i, :]) for i = 1:ncharacters]

p = plot(x, y, seriestype=:histogram, title="Books per Character")

savefig(p, "plot11.png")

end

# Compute characters per book histogram

println("Plotting characters per book histogram")

let x = 1:ncomics, y = [sum(appearances[:, j]) for j = 1:ncomics]

p = plot(x, y, seriestype=:histogram, title="Characters per Book")

savefig(p, "plot22.png")

end

# Compute collaboration matrix

println("Computing collaboration matrix")

# Compute collaboration matrix

collaborations = appearances \* appearances'

println("Plotting collaboration histogram")

let x = 1:ncharacters, y = [sum(collaborations[i, 1:i-1]) for i = 1:ncharacters]

p = plot(x, y, seriestype=:histogram, title="Collaborations")

savefig(p, "plot33.png")

end

@show collaborations[1:30, 1:30]

nums = spidey\_numbers(collaborations)

#@show nums

#printing

for i = 1:ncharacters

name = characters[i]

s = nums[i]

if s == -1

@printf("%s has a Spider Man number grater than 6\n", name)

else

@printf("%s has a Spider Man number of %d\n", name,s)

end

end

end

main()

* **This is the output of my program.**

include("marvel-SucharitaDas.jl")

Reading Marvel universe network

Number of characters = 6486

Number of comics = 12942

Mean books per character = 14.90

Mean characters per book = 7.47

Plotting books per character histogram

Plotting characters per book histogram

Computing collaboration matrix

Plotting collaboration histogram

collaborations[1:30, 1:30] =

[1 , 1] = 1

[2 , 2] = 9

[3 , 3] = 9

[4 , 4] = 3

[5 , 5] = 3

[6 , 6] = 4

[7 , 7] = 1

[8 , 8] = 2

[9 , 9] = 2

[10, 10] = 45

[16, 10] = 1

[21, 10] = 1

[11, 11] = 1

[17, 11] = 1

[12, 12] = 3

[13, 13] = 4

24-HOUR MAN/EMMANUEL has a Spider Man number of 3

3-D MAN/CHARLES CHAN has a Spider Man number of 1

4-D MAN/MERCURIO has a Spider Man number of 2

8-BALL/ has a Spider Man number of 2

A has a Spider Man number of 2

A'YIN has a Spider Man number of 2

ABBOTT, JACK has a Spider Man number of 1

ABCISSA has a Spider Man number of 2

ABEL has a Spider Man number of 2

ABOMINATION/EMIL BLO has a Spider Man number of 1

ABOMINATION | MUTANT has a Spider Man number of 2

ABOMINATRIX has a Spider Man number of 2

ABRAXAS has a Spider Man number of 2

ADAM 3,031 has a Spider Man number of 2

ABSALOM has a Spider Man number of 2

ABSORBING MAN/CARL C has a Spider Man number of 1

ABSORBING MAN | MUTA has a Spider Man number of 2

ACBA has a Spider Man number of 2

ACHEBE, REVEREND DOC has a Spider Man number of 2

ACHILLES has a Spider Man number of 3

ACHILLES II/HELMUT has a Spider Man number of 2

ACROBAT/CARL ZANTE has a Spider Man number of 2

ADAM X has a Spider Man number of 2

ADAMS, CINDY has a Spider Man number of 2

ADAMS, CONGRESSMAN H has a Spider Man number of 1

ADAMS, GEORGE has a Spider Man number of 2

ADAMS, MARTHA has a Spider Man number of 2

ADAMS, NICOLE NIKKI has a Spider Man number of 2

ADAMSON, JASON has a Spider Man number of 3

ADAMSON, REBECCA has a Spider Man number of 3

ADMIRAL PROTOCOL/ has a Spider Man number of 2

ADORA has a Spider Man number of 1

ADORA CLONE has a Spider Man number of 2

ADRIA has a Spider Man number of 2

ADVA has a Spider Man number of 1

ADVENT/KYLE GROBE has a Spider Man number of 2

ADVERSARY has a Spider Man number of 2

AEGIS/TREY ROLLINS has a Spider Man number of 2

AENTAROS has a Spider Man number of 2

AFTERLIFE has a Spider Man number of 2

AGAMEMNON has a Spider Man number of 3

AGAMEMNON II/ANDREI has a Spider Man number of 2

AGAMEMNON III/ has a Spider Man number of 2

AGAMOTTO has a Spider Man number of 1

AGARN, CAPT. has a Spider Man number of 3

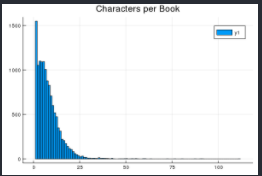
AGED GENGHIS has a Spider Man number of 2

AGEE, DR. AUBREY has a Spider Man number of 2

AGEE, REBECCA has a Spider Man number of 2

* The program will create plot.png file after running.





**Discussion and Conclusion**

I wrote this code in Julia and this is a new programming language for me. We had very short time to learn a new language. I tried my best to execute the program. Professor explained in the class a lot and the step by step algorithm. I understand the algorithm part. I like to learn more this modern language. I can understand the julia code after reading somebody else’s code. I am excited to see what I can do in the future with this innovative, promising language. This language is very new and I am glad that I have made through this assignment.