



Computer Networks II

COMS2014

Group Project 2018

Introduction

Each group has the option of implementing ONE out of the two proposed projects below:

1. Counting Primes
2. Counting Letters

Project 1 - Counting Primes

In this project, your task is to code an implementable program that can count how many prime numbers there are between two numbers input by the user.

Start off by coding a **nondistributed** program that will count and print the number of primes between the 2 input values. This program should also print the **time it takes** to obtain the answer.

Submission

You are to submit a **distributed** version of your program using the client-server approach between one client and two servers. This is how it works:

After the two input values have been specified by the user, the client will:

1. Divide that total range into two sub-ranges
2. Pass each sub-range to a server (one range for one server).
3. Collect the replies (a single value from the servers) which are then added together to obtain the total number of primes contained in the total range.

You are to establish a TCP connection between the client and both servers. The client sends each server two numbers which represent the **upper** and **lower** limits of the sub-range to count the prime numbers. Each server will then return the number of primes contained within their sub-range using the **count_primes()** method implemented on their side.

Here is an example of the interaction between the clients and two servers for this project:

Host A - client; Host B, Host C - servers

(Host A connected to Host B and Host C)

Input from the user to specify a total range:

input 1 - first value (lower bound)

input 2 - second value (upper bound)

Host A splits the range into two sub-ranges and forwards to servers:

Sending sub-range 1 (value1, value2) to Host B; start timer for Host B

Sending sub-range 2 (value3, value4) to Host C; start timer for Host C

Host A receives replies from Host B and Host C. This will be your output:

reply from Host B = no_of_primes1; time taken from Host B = B seconds

reply from Host C = no_of_primes2; time taken from Host C = C seconds

Answer = no_of_primes1 + no_of_primes2

Project 2 - Counting Letters

Your task is to code an implementable program that can count how many occurrences of a certain letter (input from the user) exist in a set of 100 randomly generated characters.

Start off by coding a **nondistributed** program that will generate a random set of 100 characters. Next, count the number of occurrences of the users input letter in the set. This program should also print the **time it takes** to obtain the answer.

Submission

You are to submit a **distributed** version of your program using the client-server approach between one client and two servers. This is how it works:

After the letter to count has been specified by the user, the client will:

1. Divide the randomly generated set of letters into two subsets
2. Pass each subset to a server (one set for one server).
3. Collect the replies (a single value from the servers) which are then added together to obtain the total number of occurrences of the letter in the set.

You are to establish a TCP connection between the client and both servers. The client sends the servers a subset of characters. Each server will then return the number of occurrences of the users input letter within their subsets using the **count_letter()** method implemented on their side.

Here is an example of the interaction between the clients and two servers for this project:

Host A connects to Host B and Host C:

Host A - client; Host B, Host C - servers

Input from the user to specify a letter to count:

input_character = Letter

Generate random set of 100 characters.

Host A splits the set into two subsets and forwards to servers:

Sending subset 1 to Host B; start timer for Host B

Sending subset 2 to Host C; start timer for Host C

Host A receives replies from Host B and Host C. This will be your output:

reply from Host B = no_of_occurences1; time taken from Host B = B seconds

reply from Host C = no_of_occurences2; time taken from Host C = C seconds

Answer = no_of_occurences1 + no_of_occurences2

NOTE:

- Groups will present their projects in the Labs on **Monday, 29th of October**. Groups will get a chance to choose a timeslot for presenting in due time.
- Each group presentation is limited to a time span of 10 minutes, and 5 minutes of questioning.
- Each member must be able to discuss what they contributed towards the project during the presentation.
- Groups have the choice of choosing any one of the the two projects mentioned above, and also a choice of programming in C++, Java, or Python.
- Originality, creativity and extra effort to make your project look distinct will boost your mark.

All the best to you!