UAB

Socket Programming Project

CS 334/534 Networking

Project Requirements

In this project, you will gain hands-on experience on both TCP and UDP socket programming. You are required to write a program (STUDENT) to interact with the provided program (ROBOT). You are allowed to use the ROBOT source code given (either Java or Python) in the project package to complete this project. All students should finish Steps 1 to 6. This project can be completed by a group of two students or alone. It is your responsibility to find your teammate if you choose to work as a group. You will need to demo your program to the TA as required by Step 6, and if you work alone, the TA will run the ROBOT program on his machine to help you demo your STUDENT program. EVERY student should turn in their own source code whether they work in a group or not.

This project will be conducted over 3 lab sessions.

- Lab #1 is on February 11, 2022, and will teach preliminaries about the lab tasks and programming basics in Python.
- Lab #2 on February 18, 2022, is a working lab where you will continue working on the project or demonstrate the finished program to the TA if ready.
- Lab #3 on February 25, 2022, is the last date to demonstrate your work.

Each group should compile, run, and demonstrate their program in front of the TA. The TA may ask some questions related to the program; answer correctness will affect your grading of this lab.
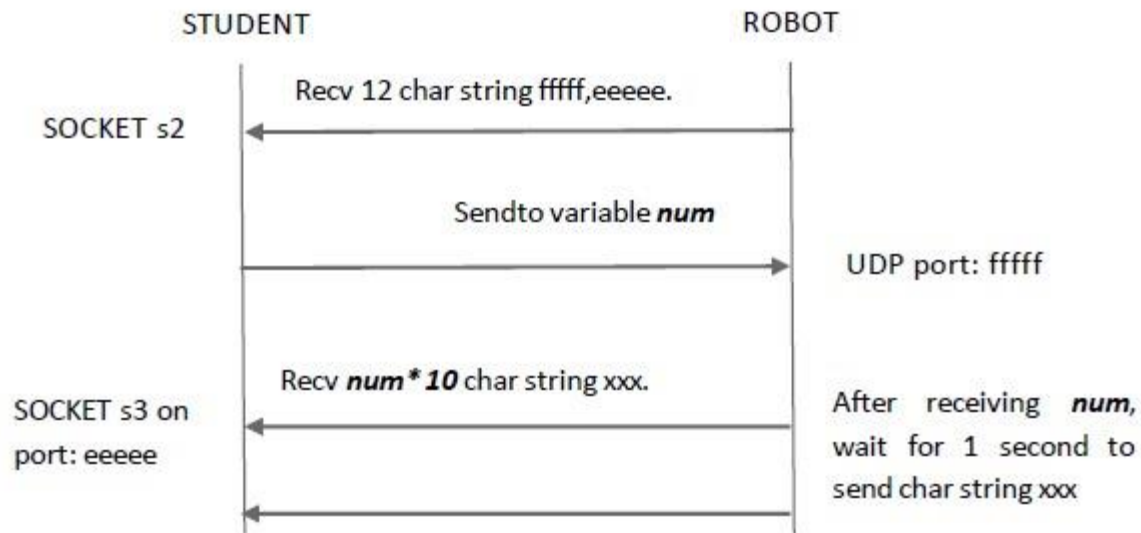
Steps:

Your program has to interact with ROBOT according to the following steps:

1. Start the ROBOT using either Python or Java:
    a. python robot.py
    b. java robot (you need to compile first using javac robot.java)

2. When the ROBOT is started, a message "ROBOT IS STARTED" will be printed, indicating that the ROBOT is now listening on TCP Port 3310. STUDENT has to connect to the ROBOT TCP Port 3310 and send your BlazerID via the connection established.

3. The ROBOT will then send a 5 char string ddddd to the STUDENT. STUDENT will need to create a TCP socket s_2 at port ddddd to accept a new connection. The ROBOT will initiate the new connection 1 second later after sending ddddd. Upon accepting the connection, a new socket s2 will be returned.
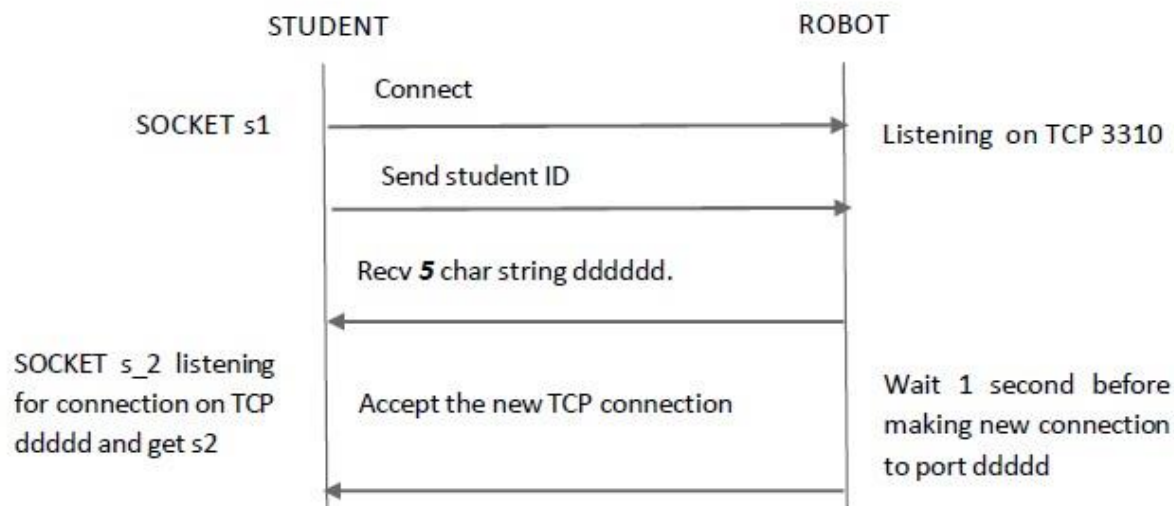

4. ROBOT will then send a 12 char string "fffff,eeeee." to the STUDENT using the new connection. STUDENT needs to decode the message and create a UDP socket s3 to send a variable num ($5 < num < 10$) to ROBOT on port fffff. Then ROBOT will send a char string xxx with length num * 10 to STUDENT one second after receiving num and STUDENT will receive the string using s3 on port eeeee . ROBOT will send the string xxx 5 times, once every 1 second.
STUDENT only needs to receive any one of them.

STUDENT

Recv 12 char string fffff,eeeee.

SOCKET s2

Sendto variable num

ROBOT

UDP port: fffff

Recv num*10 char string xxx.

SOCKET s3 on
port: eeeee

After receiving **num**, wait for 1 second to send char string xxx

5. When the STUDENT received the char string xxx, it will send back the string to the ROBOT at UDP port fffff. Similar to the ROBOT, the string will be sent 5 times, once every 1 second. The ROBOT will check if the two strings are the same.

STUDENT

Sendto num*10 char string 5 times

SOCKET s3

ROBOT

UDP port: fffff

num*10 char string
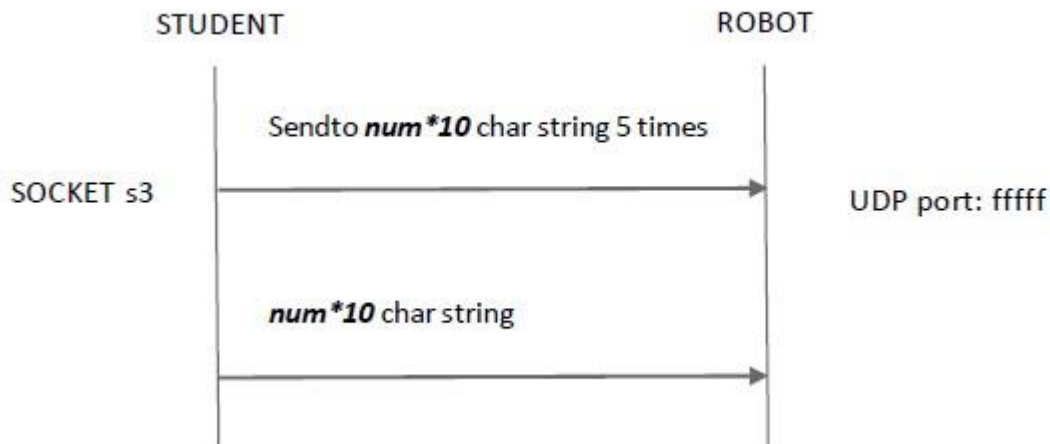
6. In this step, you need to run ROBOT and STUDENT on 2 different machines and make sure all the steps above can be successfully executed. You may need to use Wireshark on the machines for network level debugging if necessary, e.g. if there is a firewall on either of the machine and/or along their end-to-end path, the programs may fail. It is then your responsibility to fix it, e.g. by choosing a different pair of machines elsewhere and/or configure them properly.

Demo your completed project to the TA.
(For steps 1 to 6, the original provided ROBOT will be used to test your STUDENT program.)

Programming Language and Platform
Students can use Java or Python to complete the project.

Submission
Students are required to submit a zip file containing the executable files and source code of both STUDENT and ROBOT.

Project Submission Checklist:
The final source code for STUDENT and ROBOT and an executable file for each of them.

If you worked as a group, please comment the first line of your code about your group member information:

- (For Python) #My Name: XXX, My Partner: XXX

- (For Java) //My Name: XXX, My Partner: XXX

- If you worked alone, please comment the first line of your code with "I XXX Worked Alone"