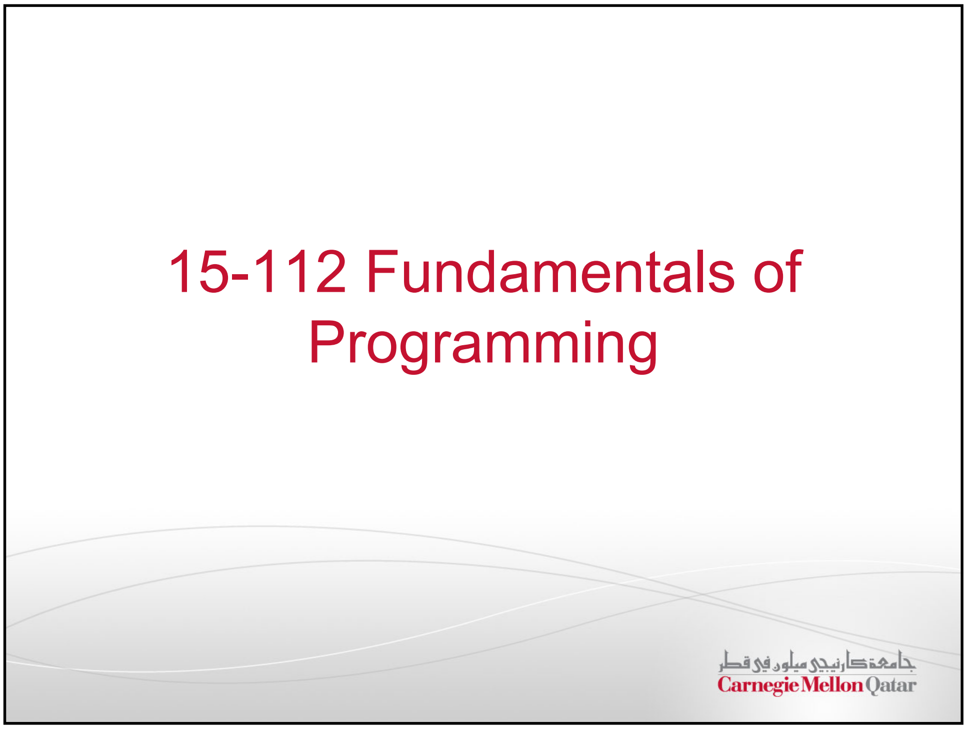
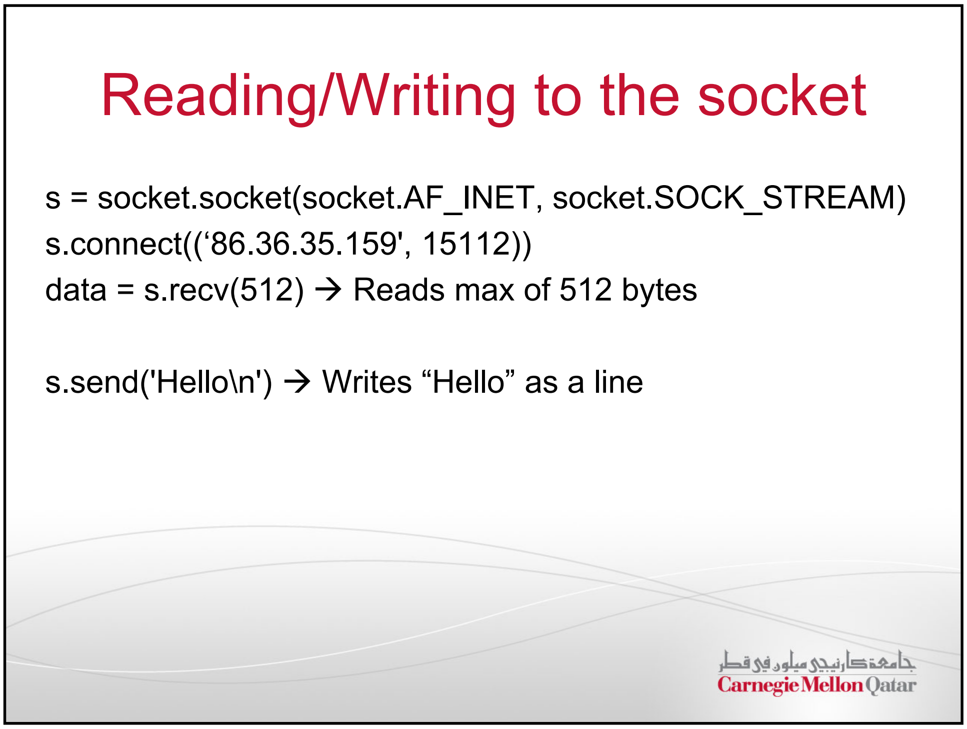


15-112 Fundamentals of Programming

What are we doing

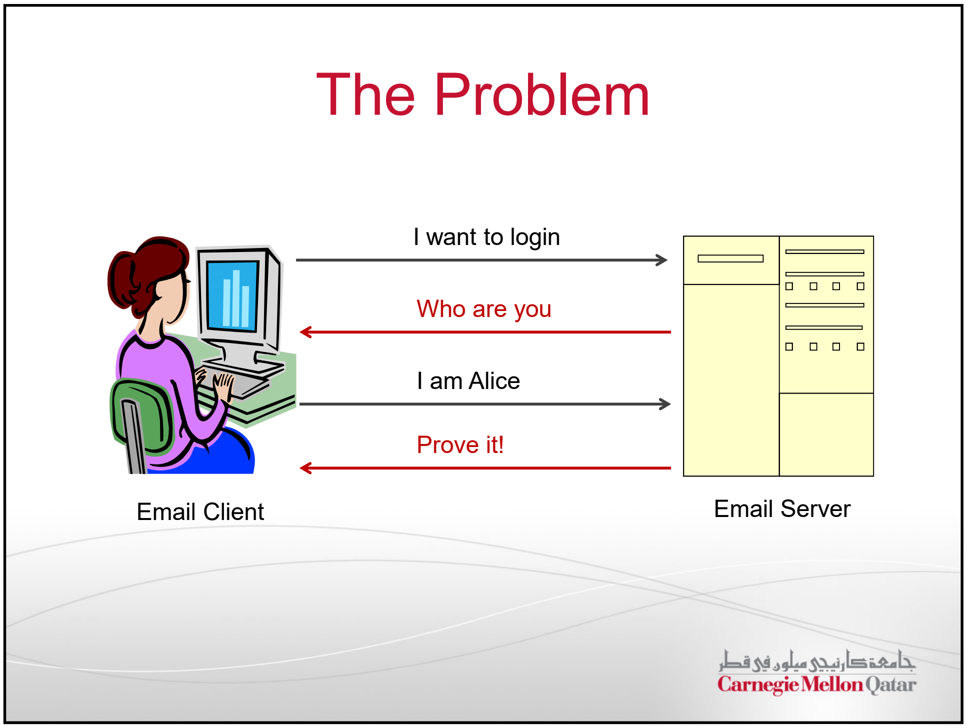
- ❑ More practice with sockets
- ❑ Network Authentication
  - Challenge-Response Authentication (CRA)



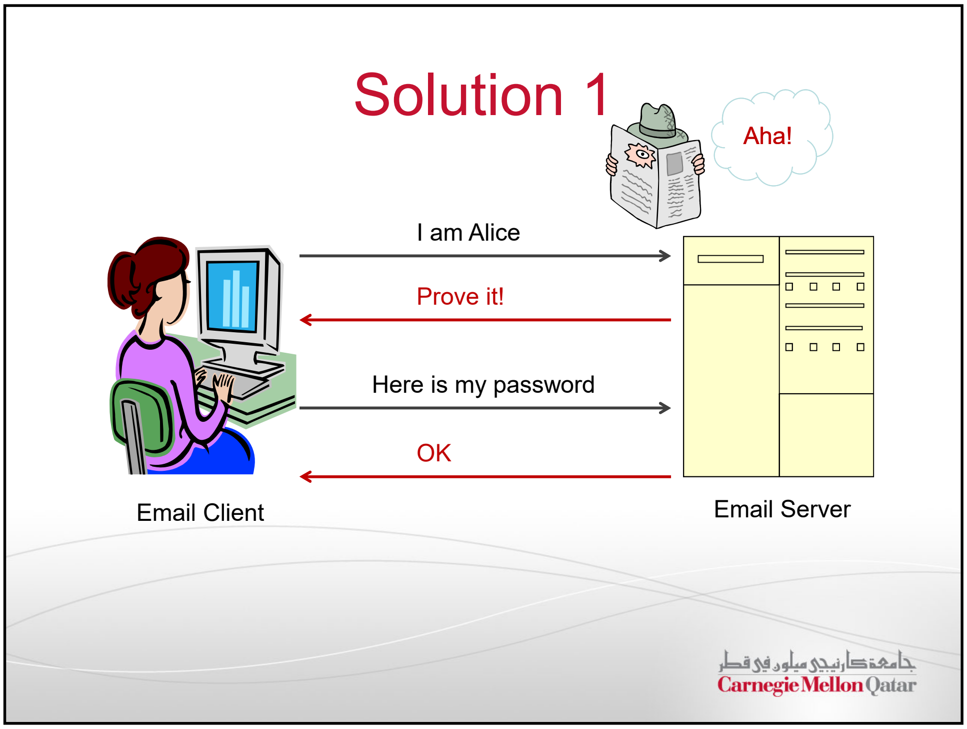
Reading/Writing to the socket

s = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
s.connect((‘86.36.35.159', 15112))
data = s.recv(512) → Reads max of 512 bytes

s.send('Hello\n') → Writes “Hello” as a line

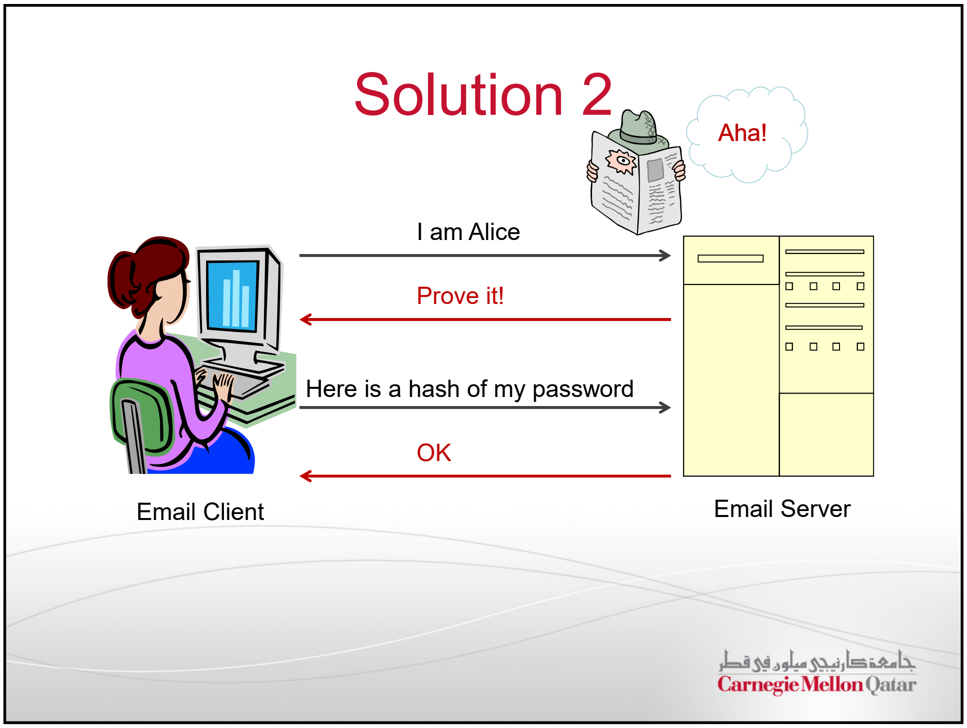


The Problem



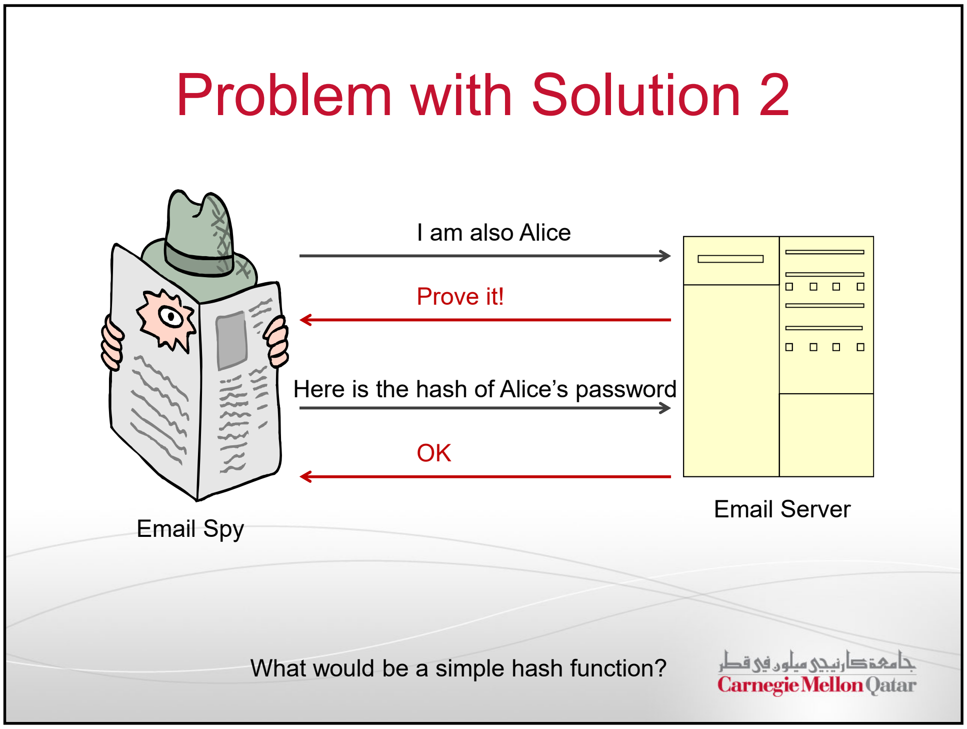
Solution 1

جامعة كارنيجي ميلون في قطر
Carnegie Mellon Qatar



Solution 2

جامعة كارنيجي ميلون في قطر
Carnegie Mellon Qatar



Problem with Solution 2

I am also Alice

Prove it!

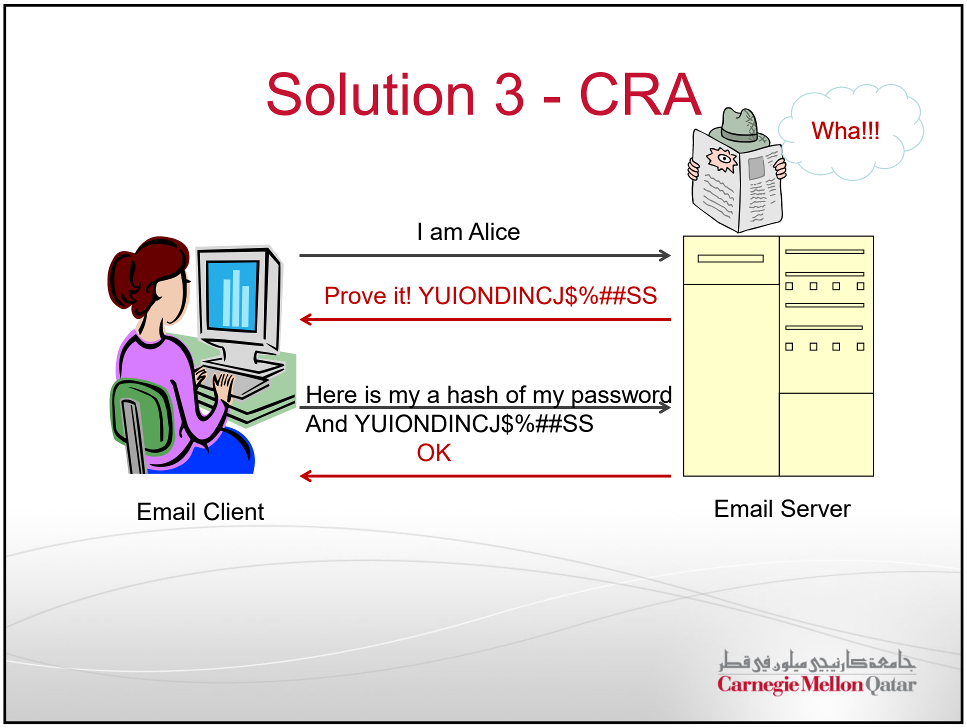
Here is the hash of Alice's password

OK

Email Spy

Email Server

What would be a simple hash function?



Solution 3 - CRA

Wha!!!

I am Alice

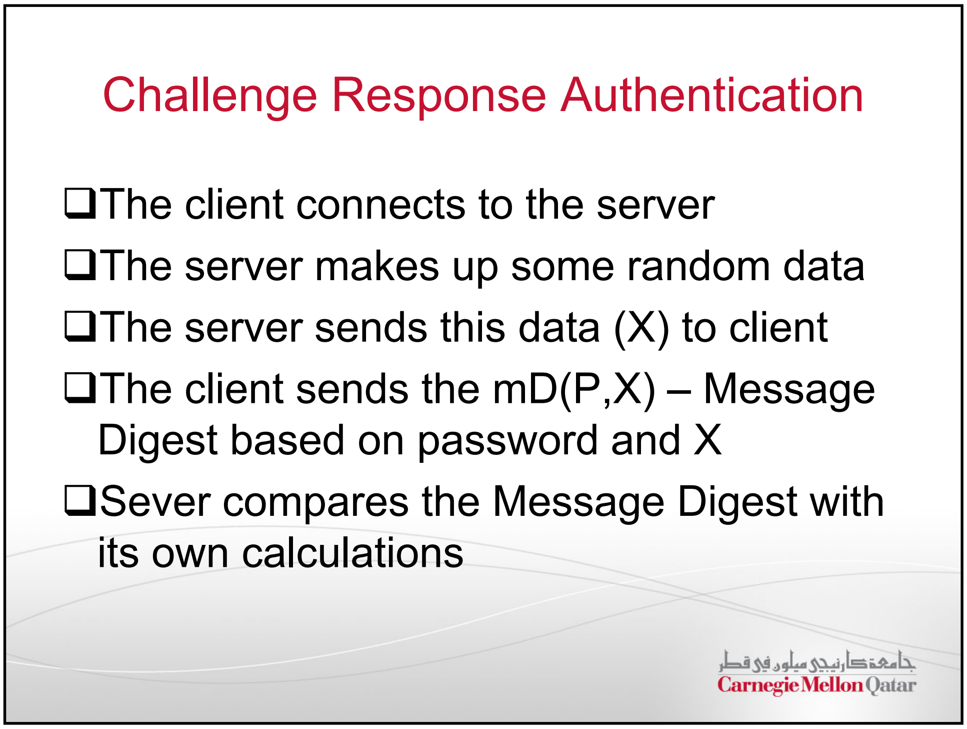
Prove it! YUIONDINCJ$%##SS

Here is my a hash of my password
And YUIONDINCJ$%##SS

OK

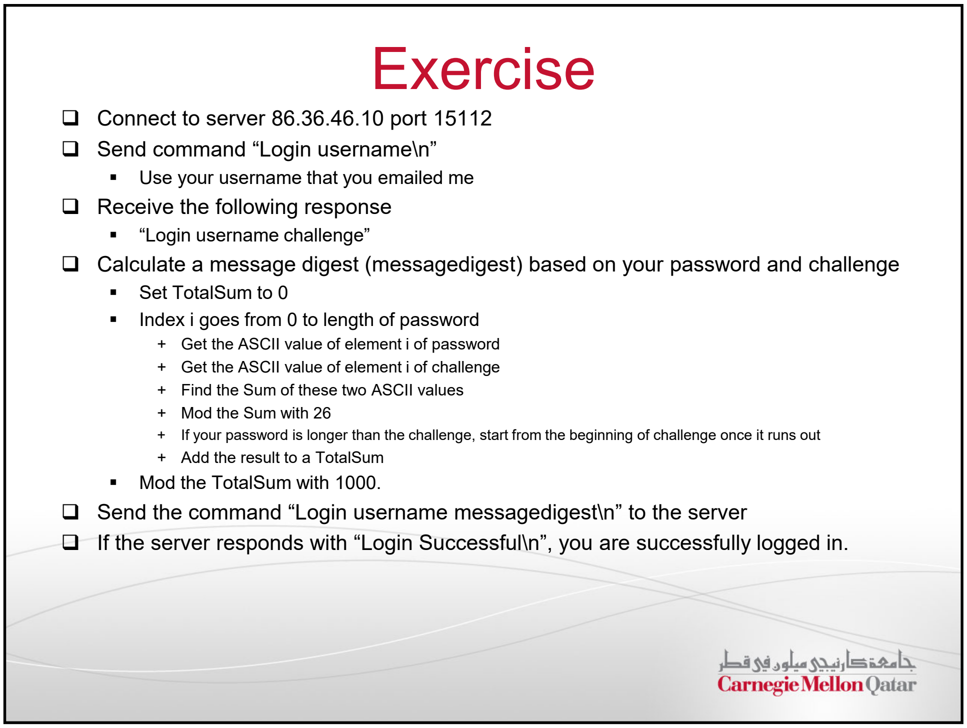
Email Client

Email Server



Challenge Response Authentication

- ❑The client connects to the server
- ❑The server makes up some random data
- ❑The server sends this data (X) to client
- ❑The client sends the mD(P,X) – Message Digest based on password and X
- ❑Sever compares the Message Digest with its own calculations



Exercise

- ❑ Connect to server 86.36.46.10 port 15112
- ❑ Send command “Login username\n”
  - ▪ Use your username that you emailed me
- ❑ Receive the following response
  - ▪ “Login username challenge”
- ❑ Calculate a message digest (messagedigest) based on your password and challenge
  - ▪ Set TotalSum to 0
  - ▪ Index i goes from 0 to length of password
    - + Get the ASCII value of element i of password
    - + Get the ASCII value of element i of challenge
    - + Find the Sum of these two ASCII values
    - + Mod the Sum with 26
    - + If your password is longer than the challenge, start from the beginning of challenge once it runs out
    - + Add the result to a TotalSum
  - ▪ Mod the TotalSum with 1000.
- ❑ Send the command “Login username messagedigest\n” to the server
- ❑ If the server responds with “Login Successful\n”, you are successfully logged in.