Project Report: Rainbow Ink

Old Dominion University

# **CYSE 250**

# Basic Cybersecurity Programming and Networking

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7 December 2022

# RAINBOW INK

## **OVERVIEW**

#### 1. Problem Statements of Real Client

Rainbow Ink is a fairly new, small business and they just opened up a second location since their first store is doing so well. They are excited to start expanding their pen company but have run into some problems. The issue they have come into is communicating with the second location and knowing how many more boxes to order for them so that the inventory doesn't run low. They don't think it is necessary to get any more devices than they already have which is a laptop at each location since the business is not that big, yet. They are desperately needing some type of solution to communicate with the second location to fulfill their inventory needs.

#### 2. Hardware/Software Details

Hardware used in this project are MAC laptop, Windows Desktop, keyboard, and mouse. Software used in this project is IDLE (Python 3.11 64-bit) and PyCharm Community Edition 2022.2.3. Operating Systems used: Microsoft Windows and macOS. Internet Browsers used: Firefox. Productivity Software used: Microsoft Office (Word).

#### 3. Results & Discussion

(Server) When we first run the server code in its own terminal, this is what displays on the IDLE showing a greeting function, "Welcome to Rainbow Ink's Inventory Management" and below the greeting shows that it is waiting for a connection from a client:

(Client) Next, we run the client code in its own terminal and this is what it displays showing the same greeting function in the server terminal and that it has successfully connected to the server or main location of Rainbow Ink because it shows the (-) symbol:

```
      *IDLE Shell 3.11.0*
      -
      -
      ×

      File
      Edit
      Shell
      Debug
      Options
      Window
      Help

      Python 3.11.0
      (main, Oct 24 2022, 18:26:48)
      [MSC v.1933 64 bit (AMD64)] on win32
      *

      Type
      "help", "copyright", "credits" or "license()" for more information.
      *

      ====
      RESTART: C:\Users\sarah\AppData\Local\Programs\Python\Python311\cli.py
      ====

      Welcome to Rainbow
      Ink's Inventory
      Management
      -
```

(Client) In the client terminal, we type in "hello" to start the server with asking inventory questions about the second location as shown below.

```
      *IDLE Shell 3.11.0*
      -
      -
      ×

      File
      Edit Shell Debug Options Window Help
      -
      -
      ×

      Python 3.11.0 (main, Oct 24 2022, 18:26:48) [MSC v.1933 64 bit (AMD64)] on win32
      *

      Type "help", "copyright", "credits" or "license()" for more information.

      ===== RESTART: C:\Users\sarah\AppData\Local\Programs\Python\Python311\cli.py ====

      Welcome to Rainbow Ink's Inventory Management

      -hello
      Please enter the amount of Blue Ink pen boxes in inventory:
```

(Client) Then the employee at the second location inputs how many boxes of each color pen they currently have. It also displays the different pens that the company sells in a list along with the minimum inventory Rainbow Ink should have at all times in a dictionary.

```
Welcome to Rainbow Ink's Inventory Management
-hello
Please enter the amount of Blue Ink pen boxes in inventory: 250
Please enter the amount of Black Ink pen boxes in inventory: 100
Please enter the amount of Yellow Ink pen boxes in inventory: 50
Please enter the amount of Red Ink pen boxes in inventory: 200
This is the different pens that Rainbow Ink sells:['yellow', 'red', 'blue', 'black'
]This is the minimum inventory Rainbow Ink should have{'Blue_pen : 250', 'Black_pen
: 500', 'Red pen : 200', 'Yellow pen : 100'}hello25010050
```

(Server) After the employee at the second location indicates how many boxes of each color pen they currently have, the server identifies how many more boxes of each color pen to order, if there is any, to the main location so they can order more boxes.

```
Welcome to Rainbow Ink's Inventory Management
Waiting for connection ...
...connected from : ('127.0.0.1', 60019)
This is the different pens that Rainbow Ink sells:['yellow', 'red', 'blue', 'black']
This is the minimum inventory Rainbow Ink should have{'Blue_pen : 250', 'Black_pen: 500',
'Red_pen : 200', 'Yellow_pen : 100'}
You do not need to order anymore blue pens
Order 400 more boxes of black ink pens
Order 200 more boxes of yellow ink pens
You do not need to order anymore red ink pens
200
```

(Client) We can then run the socket program again to display different outputs for each color pen.

```
======= RESTART: C:\Users\sarah\AppData\Local\Programs\Python\Python3ll\cli.py =======
Welcome to Rainbow Ink's Inventory Management
-hello
Please enter the amount of Blue Ink pen boxes in inventory: 250
Please enter the amount of Black Ink pen boxes in inventory: 500
Please enter the amount of Yellow Ink pen boxes in inventory: 100
Please enter the amount of Red Ink pen boxes in inventory: 100
This is the different pens that Rainbow Ink sells:['yellow', 'red', 'blue', 'black']This
is the minimum inventory Rainbow Ink should have{'Red_pen : 200', 'Blue_pen : 250', 'Bla
ck_pen: 500', 'Yellow_pen : 100'}hello250500100
```

(Server) The main location then gets notified about how many boxes of each color pen that is needed to be shipped to the second location.

```
========= RESTART: C:\Users\sarah\AppData\Local\Programs\Python\Python3ll\ser.py ========
Welcome to Rainbow Ink's Inventory Management
Waiting for connection ...
...connected from : ('127.0.0.1', 60116)
This is the different pens that Rainbow Ink sells:['yellow', 'red', 'blue', 'black']
This is the minimum inventory Rainbow Ink should have{'Red_pen : 200', 'Blue_pen : 250',
'Black_pen: 500', 'Yellow_pen : 100'}
You do not need to order anymore blue pens
Order 400 more boxes of black ink pens
You do not need to order any more boxes of yellow ink pens
Order 200 more boxes of red ink pens
100
```

### Reference

Parewa Labs Pvt. Ltd. (n.d.). Python Functions (With Examples). Programiz. Retrieved December 6, 2022, from https://www.programiz.com/pythonprogramming/function

### Appendix (Python Code)

(Server Code):

```
ser.py - C:\Users\sarah\AppData\Local\Programs\Python\Python311\ser.py (3.11.0)
                                                                                           \times
File Edit Format Run Options Window Help
1 from socket import *
2 from time import *
3 #HOST="192.168.0.71"
4 HOST = "localhost"
5 PORT = 5000
6 BUFSIZE = 1024
7 ADDRESS = (HOST, PORT)
8
9 #greet()
10 g = "Welcome to Rainbow Ink's Inventory Management"
11 print(str(g))
12
13
14 server=socket (AF_INET, SOCK_STREAM)
15 server.bind(ADDRESS)
16 server.listen(3)
17 while True:
18
      print("Waiting for connection ...")
19
       (client,address)=server.accept()
       print("...connected from : ",address)
20
21
       client.send("Welcome to Rainbow Ink's Inventory Management".encode()) #First send
22
      # Here is the list of pen types that Rainbow Ink sells
23
      pens list = ["yellow", "red", "blue", "black"]
24
      # print("This is the different pens that Rainbow Ink sells:")
25
       # print(pens_list)
26
       s = "This is the different pens that Rainbow Ink sells:"
27
       s = s + str(pens_list)
28
       print(s)
29
       client.send(s.encode()) #Second send
       RI_dict = {"Red_pen : 200", "Yellow_pen : 100", "Black_pen: 500", "Blue_pen : 250"}
30
       r = "This is the minimum inventory Rainbow Ink should have"
31
32
       r = r + str(RI_dict)
33
       print(r)
34
       client.send(r.encode()) #Third send
35
       # Take input from client
36
       blue pens = (client.recv(BUFSIZE)).decode()
37
       black_pens = (client.recv(BUFSIZE)).decode()
38
       yellow_pens = (client.recv(BUFSIZE)).decode()
39
      red pens = (client.recv(BUFSIZE)).decode()
```

```
40
41
       # Tell Rainbow Ink employee what inventory they need and how much
42
       if blue_pens < str(250):</pre>
43
           b = "Order 250 more boxes of blue ink pens"
44
           print(b)
45
       if blue pens > str(250):
           b = "You do not need to order anymore blue pens"
46
47
           print(b)
48
       client.send(blue pens.encode()) #1th send
49
       if black pens <= str(100):</pre>
50
           bl = "Order 500 more boxes of black pens"
51
           print(bl)
52
       if black_pens > str(100):
53
          bl = "Order 400 more boxes of black ink pens"
54
           print(bl)
       if black_pens > str(500):
55
56
           bl = "You do not need to order anymore boxes of black ink pens"
57
           print(bl)
58
       client.send(black_pens.encode()) #2th send
59
       if yellow_pens <= str(100):</pre>
60
           y = "Order 200 more boxes of yellow ink pens"
61
           print(y)
62
       if yellow pens >= str(200):
63
           y = "You do not need to order any more boxes of yellow ink pens"
64
           print(y)
65
       client.send(yellow pens.encode()) #3th send
66
       if red_pens <= str(200):</pre>
           rd = "Order 200 more boxes of red ink pens"
67
68
           print (rd)
69
       if red_pens > str(200):
70
           rd = "You do not need to order anymore red ink pens"
71
           print (rd)
72
       client.send(red pens.encode()) #4th send
73
74
       while True:
75
           message=(client.recv(BUFSIZE)).decode()
76
           if not message:
77
               print ("client disconnected")
78
               client.close()
79
               break
80
           else:
81
               print(message)
82
               message2 =input(">")
83
               client.send(message2.encode())
84
```

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(Client Code):

\_

cli.py - C:\Users\sarah\AppData\Local\Programs\Python\Python311\cli.py (3.11.0)

```
File Edit Format Run Options Window Help
```

```
1 import socket
2 BUFSIZE=1024
3 HOST="localhost"
 4 PORT=5000
 5 ADDRESS=(HOST, PORT)
 6
 7 soc=socket.socket()
 8 soc.connect (ADDRESS)
 9 print (soc.recv(BUFSIZE).decode())
10 while True:
      message=input("-")
11
12
      if not message:
13
          break
14
      soc.send(message.encode())
15
16
      blue pen = input ("Please enter the amount of Blue Ink pen boxes in inventory: ")
17
      soc.send(blue pen.encode())
18
      black pens = input ("Please enter the amount of Black Ink pen boxes in inventory: ")
19
      soc.send(black pens.encode())
20
      yellow pens = input ("Please enter the amount of Yellow Ink pen boxes in inventory: ")
21
      soc.send(yellow_pens.encode())
22
      red_pens = input("Please enter the amount of Red Ink pen boxes in inventory: ")
23
       soc.send(red pens.encode())
24
       # recieve input for how much inventory to order
25
       blue_pens = (soc.recv(BUFSIZE)).decode() # first reply
26
       print(blue_pens)
27
       black_pens = (soc.recv(BUFSIZE)).decode() # second reply
28
       print(black_pens)
29
       yellow pens = (soc.recv(BUFSIZE)).decode() # 3th reply
30
       print(yellow pens)
31
       red_pens = (soc.recv(BUFSIZE)).decode() # 4th reply
32
      print(red_pens)
33
34
       if not reply:
           print("server disconnected")
35
36
           break
37
       print (reply)
38 soc.close()
39
```

Ln: 38 Col: 11