WIRELESS TECHNOLOGY

ARQ PROTOCOL SIMULATION GUIDE AND GRAPH OUTPUT

MIDTERM REPLACEMENT ASSIGNMENT

BY GROUP 7

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WIRELESS TECHNOLOGY

GETTING STARTED

To use this program, you will need to have Python 3 and Anaconda installed on your computer. You can download Python 3 from the official website: Python and Anaconda from the official website: [**Anaconda**] (https://www.anaconda.com/products/distribution).
Aside from that, you need to install the Matplotlib and Numpy. You can install the two libraries from their official website: **Matplotlib** and **Numpy** .

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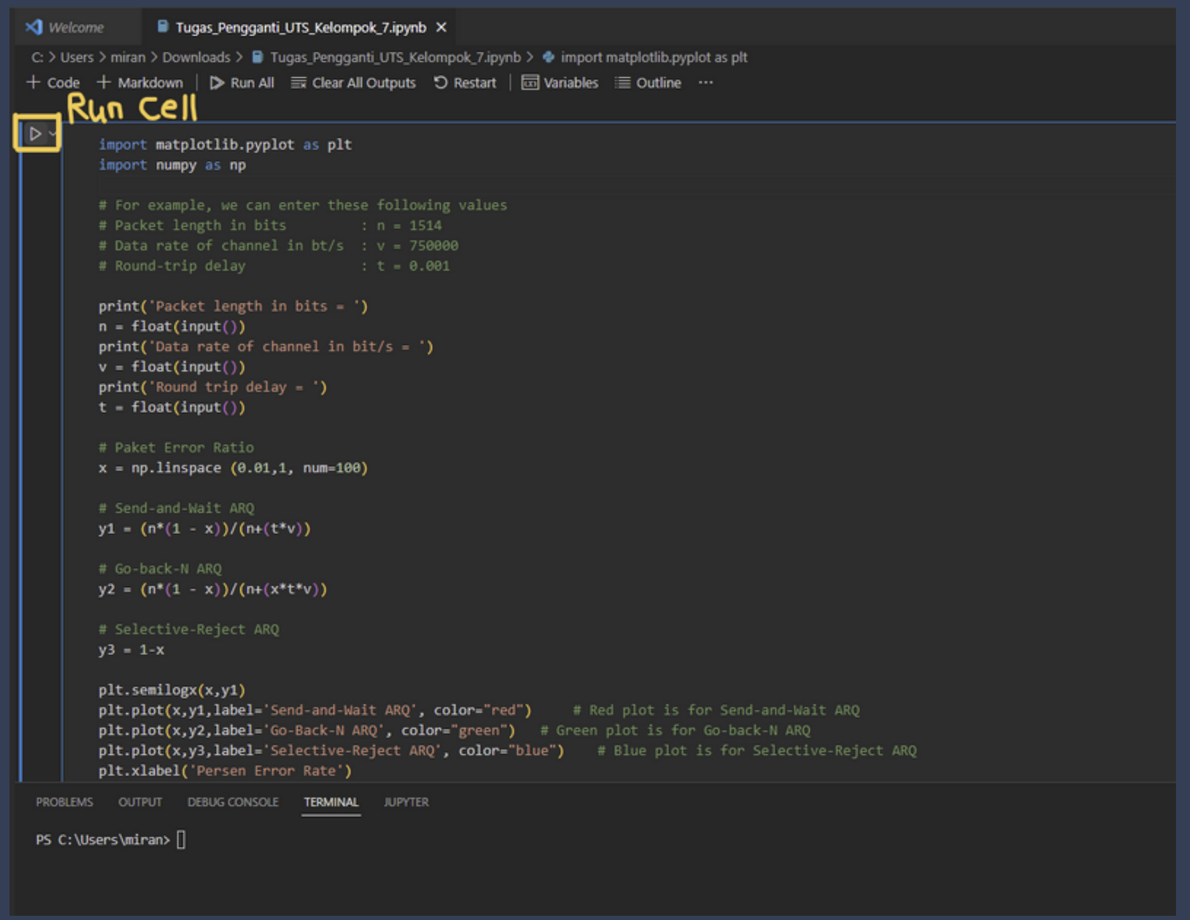
RUNNING THE PROGRAM

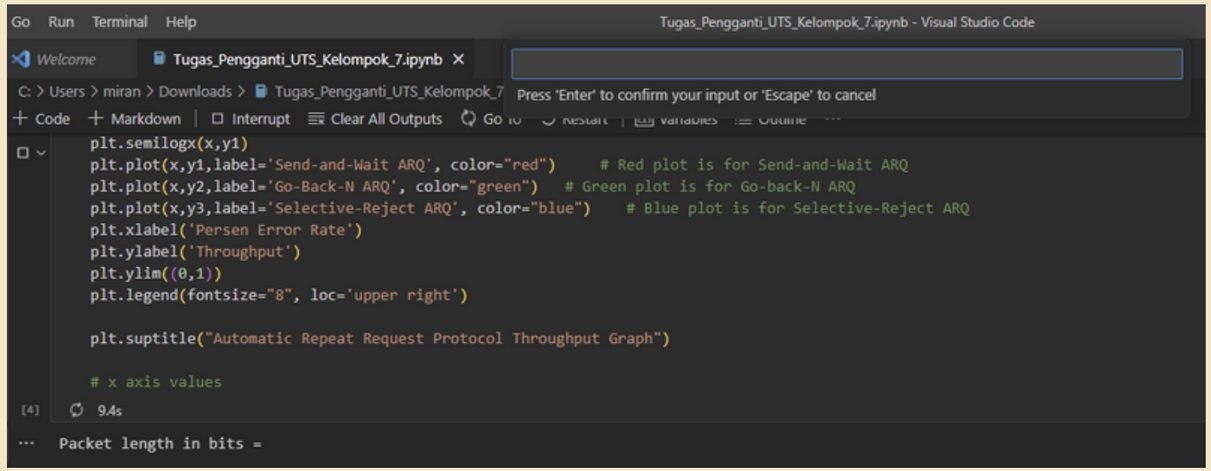
To run the program, open File Explorer and navigate to the directory where the program is saved. Then, open the program with Visual Studio Code:

1) Run the first cell

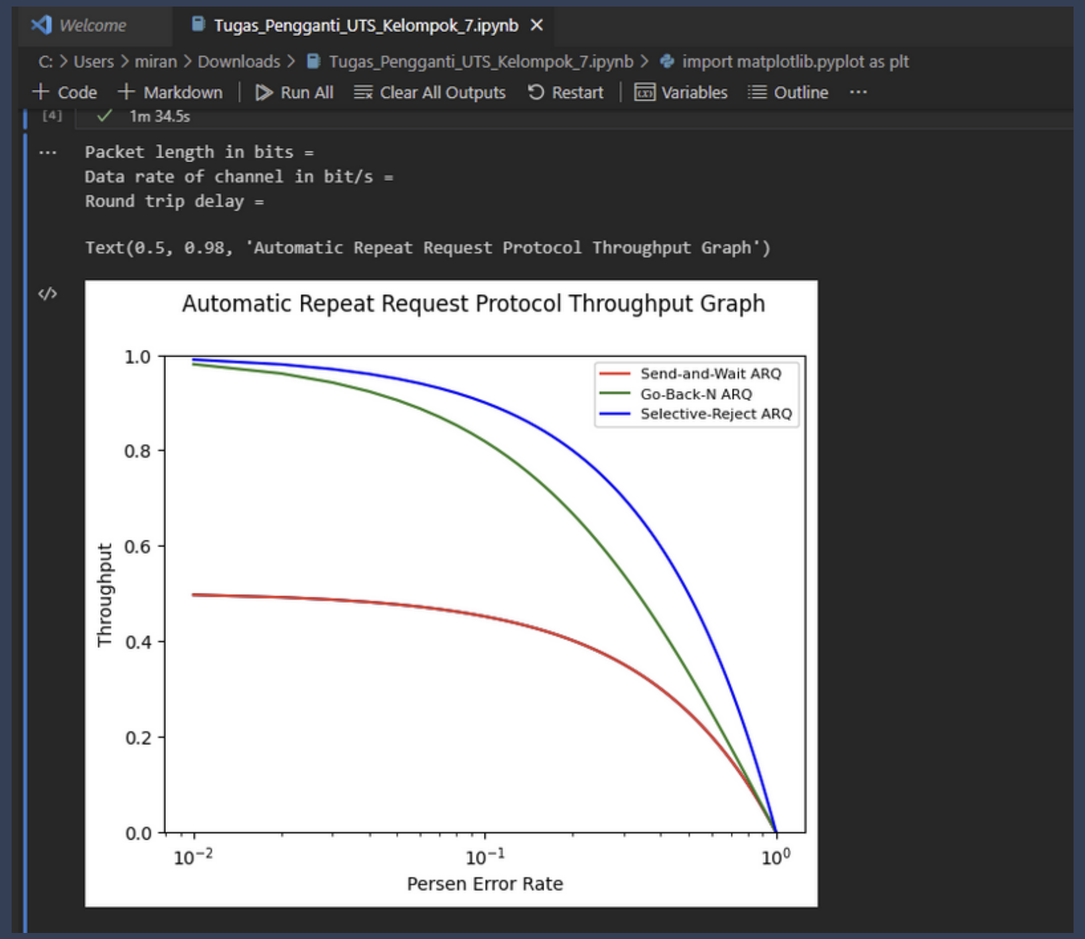


RUNNING THE PROGRAM

2) Enter the three values required: Packet length, channel data rate, and round trip delay (you can refer to the comment example in the code):



3) Click "Enter" to display the graph output of the ARQ



RUNNING THE PROGRAM

You can also run the program through Google Colaboratory through this **link**. Similar to the VS Code step, you can click on the button to run the code within the cell.

4) To get the delay average, click run on the second cell

Run Cell

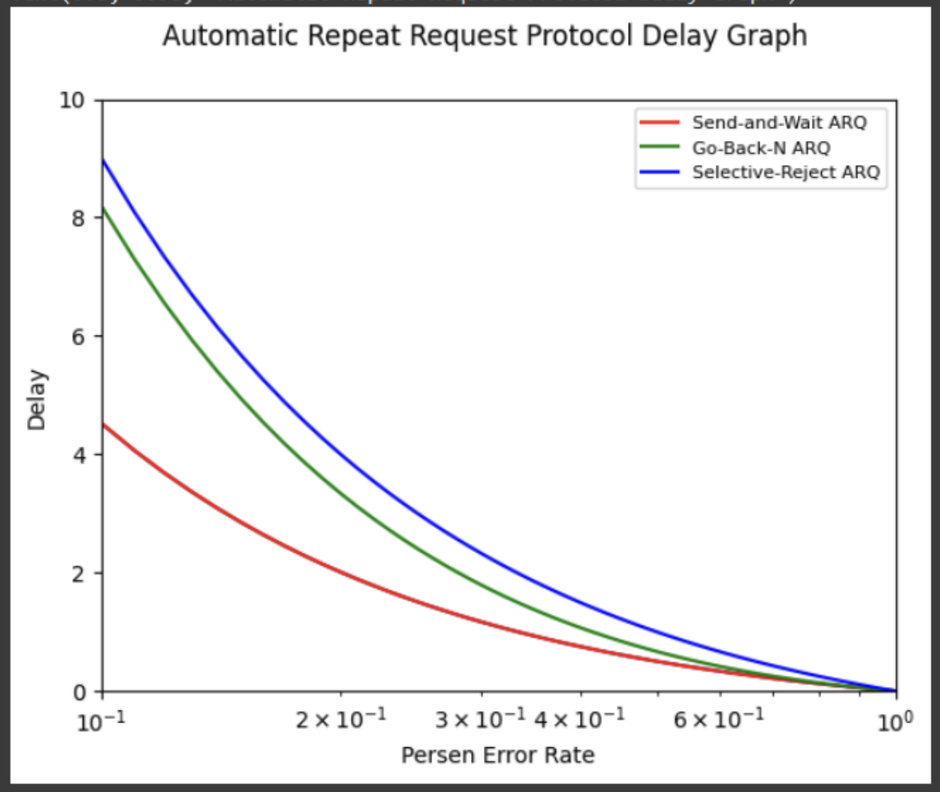
```
# Calculating ARQ Method Delay
# Transmission delay for Send-and-Wait ARQ
d1 = y1 / x
# Transmission delay for Go-Back-N ARQ
d2 = y2 / x
# Transmission delay for Selective Reject ARQ
d3 = y3 / x

#Plot for Delay
plt.semilogx(x,d1)
plt.plot(x,d1,label='Send-and-Wait ARQ', color="red")     # Red plot is for Send-and-Wait ARQ
plt.plot(x,d2,label='Go-Back-N ARQ', color="green")   # Green plot is for Go-back-N ARQ
plt.plot(x,d3,label='Selective-Reject ARQ', color="blue")    # Blue plot is for Selective-Reject ARQ
plt.xlabel('Persen Error Rate')
plt.ylabel('Delay')
plt.ylim(0, 10)
plt.xlim(0.1, 1)
plt.legend(fontsize="8", loc='upper right')
plt.suptitle("Automatic Repeat Request Protocol Delay Graph")
```

5) The delay graph will then be shown when the run cell button has been clicked

```
plt.ylim(0, 10)
plt.xlim(0.1, 1)
plt.legend(fontsize="8", loc='upper right')
plt.suptitle("Automatic Repeat Request Protocol Delay Graph")
```

```
Text(0.5, 0.98, 'Automatic Repeat Request Protocol Delay Graph')
```



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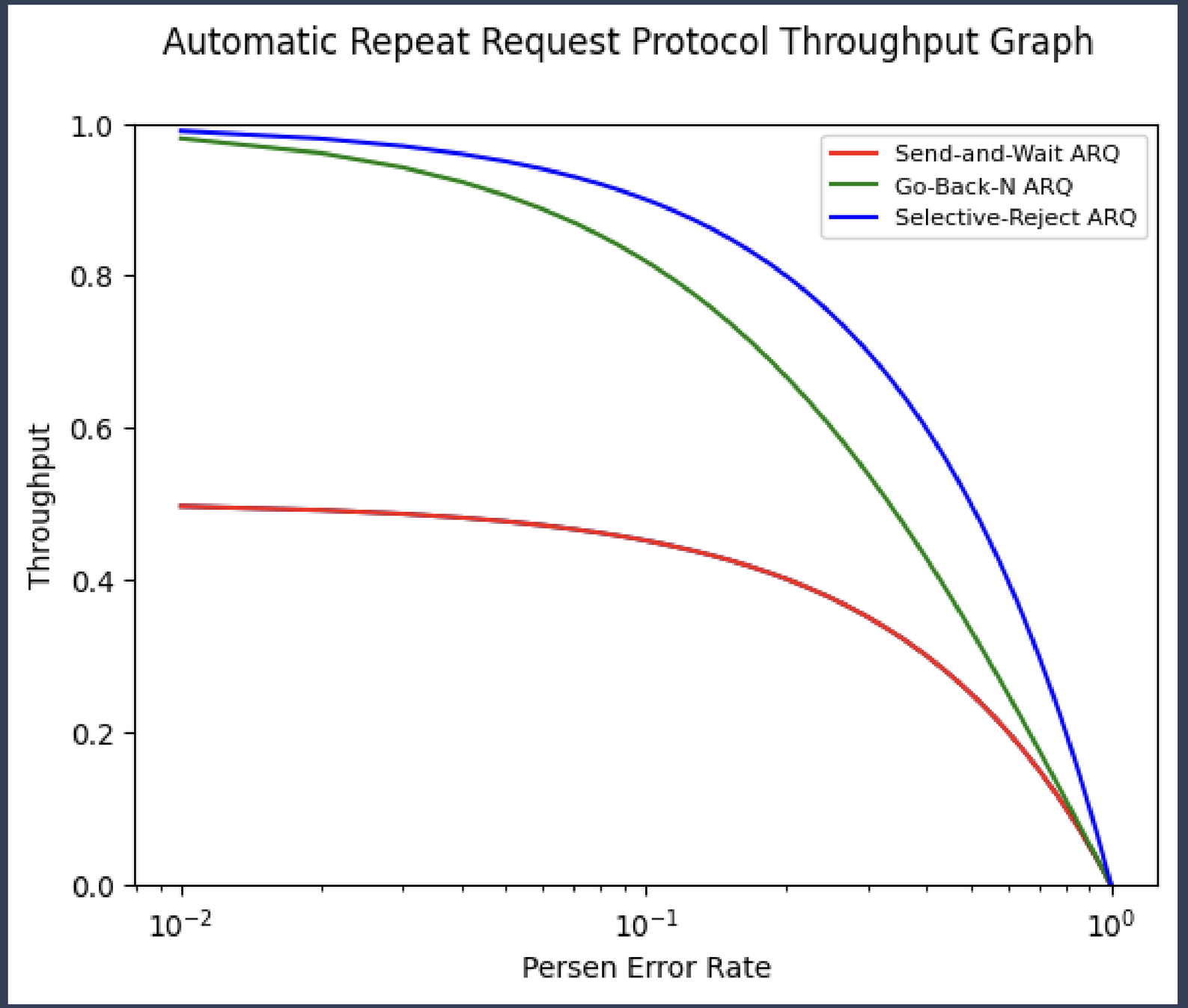
RESULT

ARQ PROTOCOL THROUGHPUT GRAPH

Packet length in bits = 1514
Data rate of channel in bit/s = 750000
Round trip delay = 0.002



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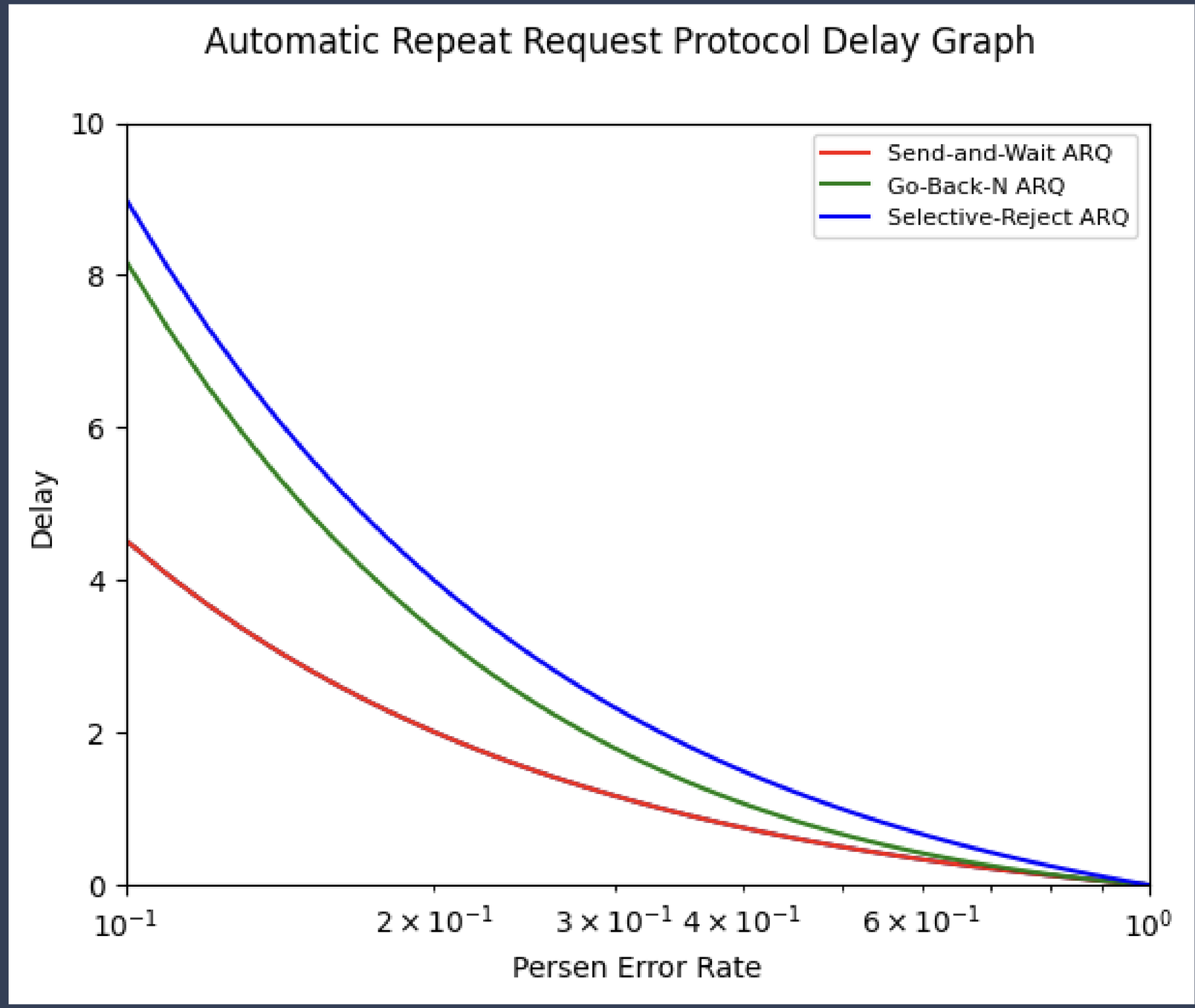
RESULT

ARQ PROTOCOL DELAY AVERAGE GRAPH

Packet length in bits = 1514
Data rate of channel in bit/s = 750000
Round trip delay = 0.002



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