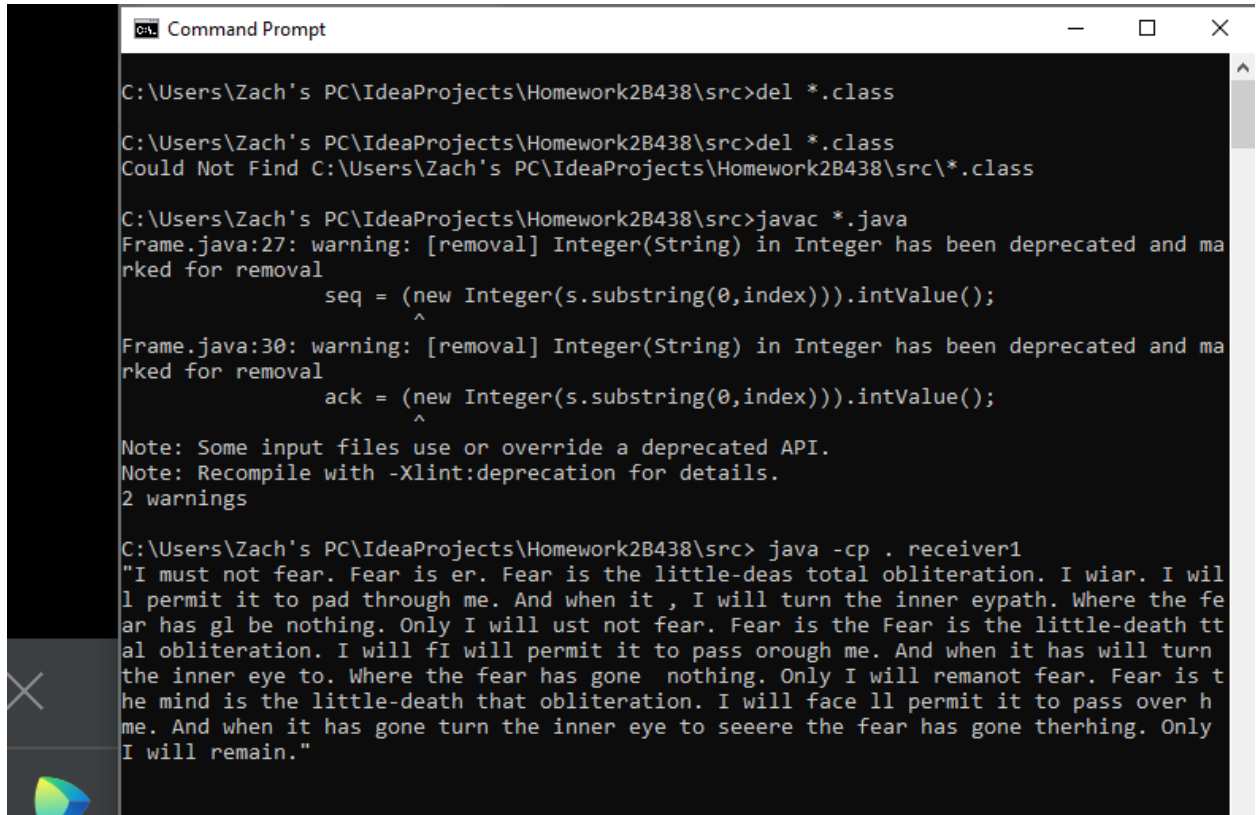Homework 2
Zachary Nelson

1. Using the protocols 1-4 on different machines involve differences for each. When executing each protocol on one machine, the completion time for displaying all contents of a given file is almost instantaneous. Between different machines on the same network, the completion time is increased, especially with larger files. The results of protocol 1, 2 and 4 are included.
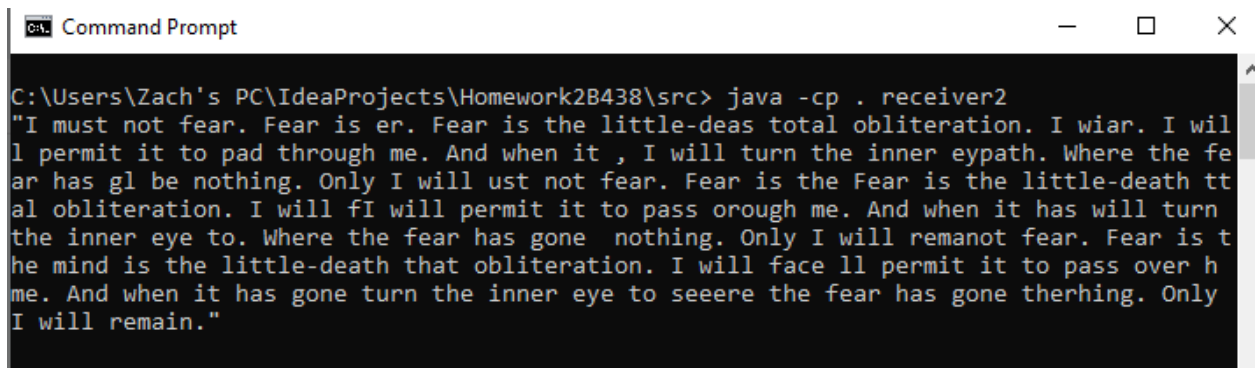
```
Command Prompt                                                                    —   □   ✕

C:\Users\Zach's PC\IdeaProjects\Homework2B438\src>del *.class
Could Not Find C:\Users\Zach's PC\IdeaProjects\Homework2B438\src\*.class

C:\Users\Zach's PC\IdeaProjects\Homework2B438\src>javac *.java
Frame.java:27: warning: [removal] Integer(String) in Integer has been deprecated and marked for removal
                seq = (new Integer(s.substring(0,index))).intValue();
                           ^
Frame.java:30: warning: [removal] Integer(String) in Integer has been deprecated and marked for removal
                ack = (new Integer(s.substring(0,index))).intValue();
                           ^
Note: Some input files use or override a deprecated API.
Note: Recompile with -Xlint:deprecation for details.
2 warnings

C:\Users\Zach's PC\IdeaProjects\Homework2B438\src>java -cp . protocol4A<testdata.txt
"I must not fear. Fear is the mind-killer. Fear is the little-death that brings total obliteration. I will face my fear. I will permit it to pass over me and through me. And whe
n it has gone past, I will turn the inner eye to see its path. Where the fear has gone there will be nothing. Only I will remain." "I must not fear. Fear is the mind-killer. Fea
r is the little-death that brings total obliteration. I will face my fear. I will permit it to pass over me and through me. And when it has gone past, I will turn the inner eye
to see its path. Where the fear has gone there will be nothing. Only I will remain." "I must not fear. Fear is the mind-killer. Fear is the little-death that brings total oblite
ration. I will face my fear. I will permit it to pass over me and through me. And when it has gone past, I will turn the inner eye to see its path. Where the fear has gone there
will be nothing. Only I will remain."

                                                                                                                                                               ^C
C:\Users\Zach's PC\IdeaProjects\Homework2B438\src>del *.class
```

The original values for the buffer size, lost frames, and timeout are as follows: buffer size = 13, lost frames = 0, timeout = 1000. These values stayed consistent unless mentioned. After changing the timeout to 10 ns I noticed little change in sending between two machines. For protocols 1 and 2, there would be a large stretch of time for completion. For protocol 4, 10ns frequent timeouts occurred before all data was printed. At timeout = 500 ns There were some timeouts and the completion time increased for all protocols. At timeout = 3000 ns there were no timeout notices.

```
⌨ Command Prompt                                              —    ▢    ✕

arked for removal
               seq = (new Integer(s.substring(0,index))).intValue();
                         ^
Frame.java:30: warning: [removal] Integer(String) in Integer has been deprecated and m
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                         ^
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                         ^
Note: Some input files use or override a deprecated API.
Note: Recompile with -Xlint:deprecation for details.
2 warnings

C:\Users\Zach's PC\IdeaProjects\Homework2B438\src>java -cp . protocol4A<testdata.txt
timeout
timeout
timeout
timeout
"I must not fear. Fear is the mind-killer. Fear is the little-death that brings total
obliteration. I will face my fear. I will permit it to pass over me and through me. An
d when it has gone past, I will turn the inner eye to see its path. Where the fear has
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will remain." "I must not fear. Fear is the mind-killer. Fear is the little-death that
 brings total obliteration. I will face my fear. I will permit it to pass over me and
through me. And when it has gone past, I will turn the inner eye to see its path. Wher
e the fear has gone there will be nothing. Only I will remain."
```

At buffer size = 10 some frames were lost at the beginning of transmission for protocol 4.
Protocols 1 and 2 were able to send all frames. At buffer size = 100 I noticed consistent
frame loss for all protocols, as the buffer size increased to 200, there were greater losses
of frames.

```
Command Prompt                                                                                    ─  ▢  ✕

C:\Users\Zach's PC\IdeaProjects\Homework2B438\src>del *.class
Could Not Find C:\Users\Zach's PC\IdeaProjects\Homework2B438\src\*.class

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Frame.java:27: warning: [removal] Integer(String) in Integer has been deprecated and marked for removal
                seq = (new Integer(s.substring(0,index))).intValue();
                            ^
Frame.java:30: warning: [removal] Integer(String) in Integer has been deprecated and marked for removal
                ack = (new Integer(s.substring(0,index))).intValue();
                            ^
Note: Some input files use or override a deprecated API.
Note: Recompile with -Xlint:deprecation for details.
2 warnings

C:\Users\Zach's PC\IdeaProjects\Homework2B438\src>java -cp . protocol4A<testdata.txt
"I must not fear. Fear is the mind-killer. Fear is the little-death that brings total obliteration. I will face my fear. I will permit it to pass over me and through me. And whe
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ration. I will face my fear. I will permit it to pass over me and through me. And when it has gone past, I will turn the inner eye to see its path. Where the fear has gone there
 will be nothing. Only I will remain."


                                                                                                                      ^C
C:\Users\Zach's PC\IdeaProjects\Homework2B438\src>del *.class
```

 At lost frames = 5 there were noticeable losses in frames for protocols 1 and 2. Protocol
4 would send all data, although completion time would increase. With lost frames = 50,
there are less noticeable frame losses. I noticed only one frame lost after running
protocols 1 and 2 on different machines.

```
"I must not fear. Fea-killer. Fear is the little-death that brings total obliteration.
```

I chose lost frames =3 to determine how being close to 1 would impact performance.
There was very noticeable frameloss for protocols 1 and 2; as the loss was significantly
greater than lost frames = 5, I would expect even more loss as lost frames is closer to 1.

```
C:\Users\Zach's PC\IdeaProjects\Homework2B438\src>java -cp . receiver2
"I must not fear. Fear is er. Fear is the little-deas total obliteration. I wiar. I will permit it to pad through me. And when it , I will turn the inner eypath. Where the fear
has gl be nothing. Only I will ust not fear. Fear is the Fear is the little-death that obliteration. I will fI will permit it to pass orough me. And when it has will turn the in
ner eye to. Where the fear has gone  nothing. Only I will remanot fear. Fear is the mind is the little-death that obliteration. I will face ll permit it to pass over h me. And w
hen it has gone turn the inner eye to seeere the fear has gone therhing. Only I will remain."



                                                   ^C
C:\Users\Zach's PC\IdeaProjects\Homework2B438\src>
```

My initial observations on spoofing any protocol is on the lack of verification and
security measures in place. For protocol 4 sending the same message on a local host, a
third party machine with an ip address and a port number can send an unsolicited
message to be read while the original protocol is running. More security measures such as
verification may be needed to secure any of these protocols.