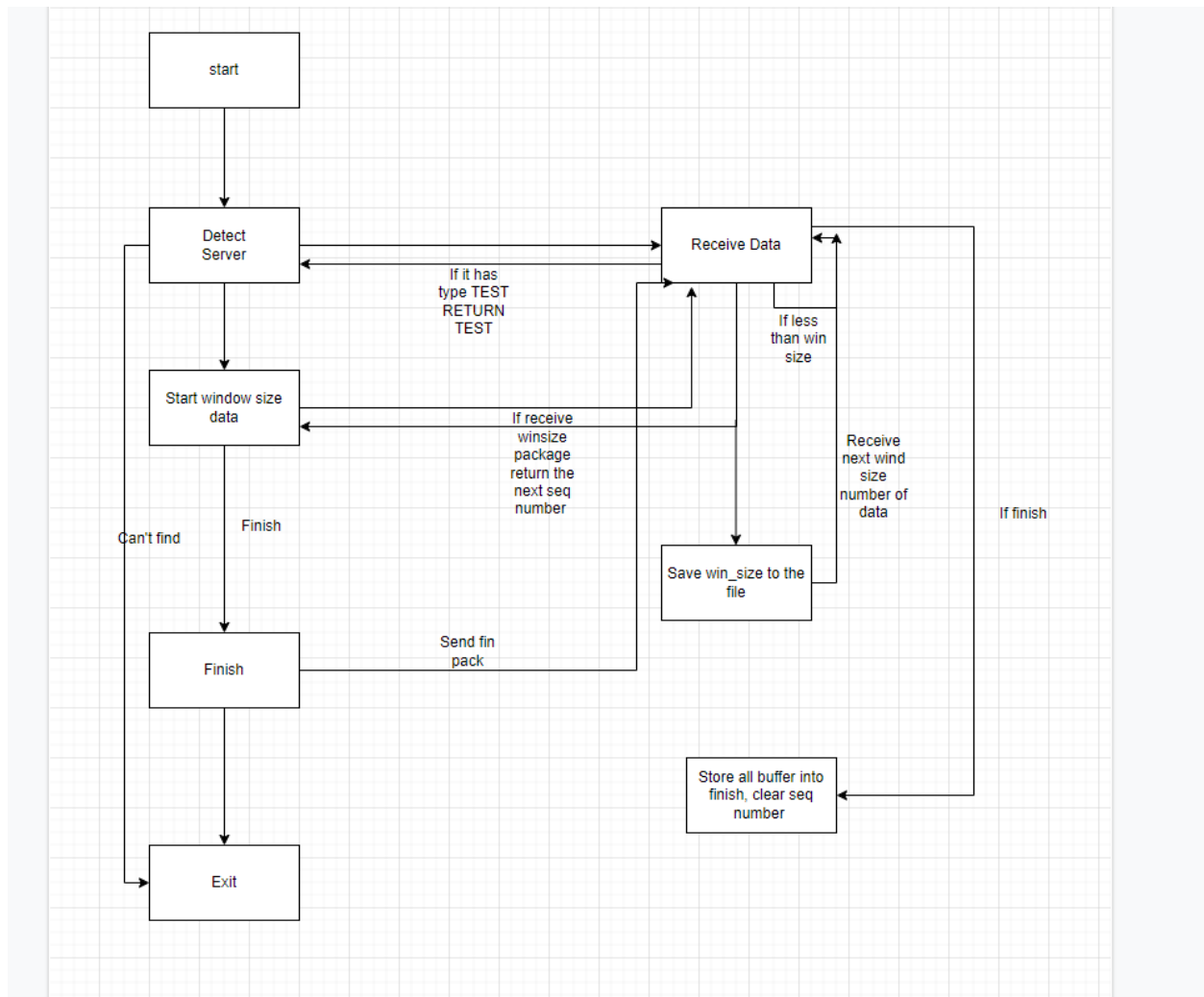
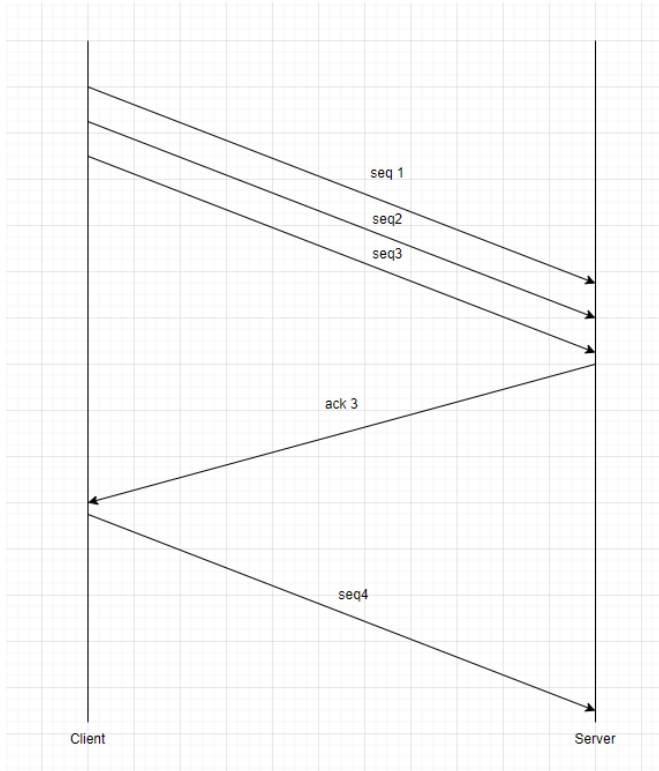


Reliable file transfer

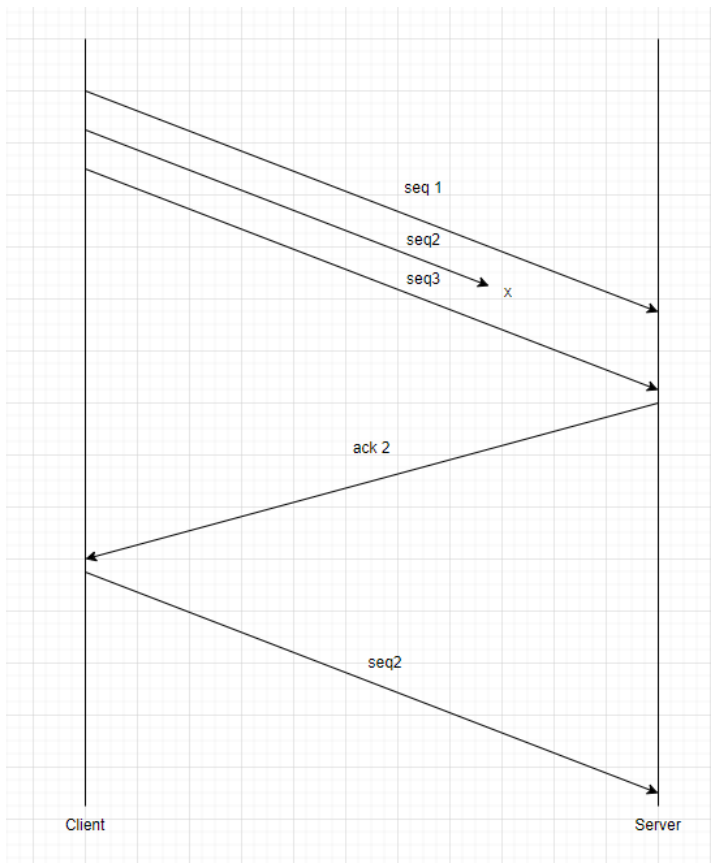
1. For this lab we will use an udp socket to create a reliable file transfer protocol.
2. First of all, I used the linked list structure from CSE101, which implemented a double linked list with a cursor. I used this to store header structure as a buffer.
3. To better understand the protocol, I create the following diagram:



4. The seq number of one window size translation will be :



5. If a package lost, the seq number will be:



6. Test

a. Basic Small file

```
(base) dongzihao@eduroam-169-233-211-22 CSE156 % cd Assignment_3
(base) dongzihao@eduroam-169-233-211-22 Assignment_3 % CLEAR
(base) dongzihao@eduroam-169-233-211-22 Assignment_3 % make
clang -Wall -Wextra -Werror -Wpedantic -g -c src/myclient.c -o bin/myclient.o
clang -Wall -Wextra -Werror -Wpedantic -g -c src/list.c -o bin/list.o
clang -Wall -Wextra -Werror -Wpedantic -g -o myclient bin/myclient.o bin/list.o -l
m
clang -Wall -Wextra -Werror -Wpedantic -g -c src/myserver.c -o bin/myserver.o
clang -Wall -Wextra -Werror -Wpedantic -g -o myserver bin/myserver.o bin/list.o
-lm
(base) dongzihao@eduroam-169-233-211-22 Assignment_3 % ./myserver 1024 0
*****recive finish storing file*****
save all
[ ]

2022-02-08T20:47:39.263T,DATA,1580,1500,1581,1600
2022-02-08T20:47:39.263T,DATA,1581,1500,1582,1600
2022-02-08T20:47:39.263T,DATA,1582,1500,1583,1600
2022-02-08T20:47:39.263T,DATA,1583,1500,1584,1600
2022-02-08T20:47:39.263T,DATA,1584,1500,1585,1600
2022-02-08T20:47:39.263T,DATA,1585,1500,1586,1600
2022-02-08T20:47:39.263T,DATA,1586,1500,1587,1600
2022-02-08T20:47:39.263T,DATA,1587,1500,1588,1600
2022-02-08T20:47:39.263T,DATA,1588,1500,1589,1600
2022-02-08T20:47:39.263T,DATA,1589,1500,1590,1600
2022-02-08T20:47:39.263T,DATA,1590,1500,1591,1600
2022-02-08T20:47:39.263T,DATA,1591,1500,1592,1600
2022-02-08T20:47:39.263T,DATA,1592,1500,1593,1600
2022-02-08T20:47:39.263T,DATA,1593,1500,1594,1600
2022-02-08T20:47:39.263T,DATA,1594,1500,1595,1600
2022-02-08T20:47:39.263T,DATA,1595,1500,1596,1600
2022-02-08T20:47:39.263T,DATA,1596,1500,1597,1600
2022-02-08T20:47:39.263T,DATA,1597,1500,1598,1600
2022-02-08T20:47:39.263T,DATA,1598,1500,1599,1600
2022-02-08T20:47:39.263T,DATA,1599,1500,1600,1600
2022-02-08T20:47:39.264T,ACK,1599,1500,1600,1600
2022-02-08T20:47:39.264T,DATA,1600,1600,1601,1601
2022-02-08T20:47:39.265T,ACK,1600,1600,1601,1601
(base) dongzihao@dongzihaoMacBook-Pro Assignment_3 %
```

b. Basic Binary file

```
save all
*****recive finish storing file*****
save all
[ ]

xt
(base) dongzihao@dongzihaoMacBook-Pro Assignment_3 % diff ./out2 ./bin/myclient.
o
diff: ./out2: No such file or directory
(base) dongzihao@dongzihaoMacBook-Pro Assignment_3 % ./myclient 127.0.0.1 1024 2
000 100 ./bin/myclient.o ./out2.txt
2022-02-08T20:51:40.615T,DATA,8,0,1,8
2022-02-08T20:51:40.616T,DATA,1,0,2,8
2022-02-08T20:51:40.616T,DATA,2,0,3,8
2022-02-08T20:51:40.616T,DATA,3,0,4,8
2022-02-08T20:51:40.616T,DATA,4,0,5,8
2022-02-08T20:51:40.616T,DATA,5,0,6,8
2022-02-08T20:51:40.616T,DATA,6,0,7,8
2022-02-08T20:51:40.616T,DATA,7,0,8,8
2022-02-08T20:51:40.616T,ACK,7,0,8,8
(base) dongzihao@dongzihaoMacBook-Pro Assignment_3 % diff bin/myclient.o ./out2.
txt
(base) dongzihao@dongzihaoMacBook-Pro Assignment_3 %
```

c. Large File

```
Terminal: Local (2) x + v
(base) dongzihao@eduroam-169-233-211-22 CSE156 % cd Assignment_3
(base) dongzihao@eduroam-169-233-211-22 Assignment_3 % CLEAR
(base) dongzihao@eduroam-169-233-211-22 Assignment_3 % make
clang -Wall -Wextra -Werror -Wpedantic -g -c src/myclient.c -o bin/myclient.o
clang -Wall -Wextra -Werror -Wpedantic -g -c src/list.c -o bin/list.o
clang -Wall -Wextra -Werror -Wpedantic -g -o myclient bin/myclient.o bin/list.o -l
m
clang -Wall -Wextra -Werror -Wpedantic -g -c src/myserver.c -o bin/myserver.o
clang -Wall -Wextra -Werror -Wpedantic -g -o myserver bin/myserver.o bin/list.o
-lm
(base) dongzihao@eduroam-169-233-211-22 Assignment_3 % ./myserver 1024 0
*****recive finish storing file*****
save all
*****recive finish storing file*****
save all
[ ]

2022-02-08T20:49:29.172T,DATA,12949,12900,12950,12977
2022-02-08T20:49:29.172T,DATA,12950,12900,12951,12977
2022-02-08T20:49:29.172T,DATA,12951,12900,12952,12977
2022-02-08T20:49:29.172T,DATA,12952,12900,12953,12977
2022-02-08T20:49:29.172T,DATA,12953,12900,12954,12977
2022-02-08T20:49:29.172T,DATA,12954,12900,12955,12977
2022-02-08T20:49:29.172T,DATA,12955,12900,12956,12977
2022-02-08T20:49:29.172T,DATA,12956,12900,12957,12977
2022-02-08T20:49:29.172T,DATA,12957,12900,12958,12977
2022-02-08T20:49:29.172T,DATA,12958,12900,12959,12977
2022-02-08T20:49:29.172T,DATA,12959,12900,12960,12977
2022-02-08T20:49:29.172T,DATA,12960,12900,12961,12977
2022-02-08T20:49:29.172T,DATA,12961,12900,12962,12977
2022-02-08T20:49:29.172T,DATA,12962,12900,12963,12977
2022-02-08T20:49:29.172T,DATA,12963,12900,12964,12977
2022-02-08T20:49:29.172T,DATA,12964,12900,12965,12977
2022-02-08T20:49:29.172T,DATA,12965,12900,12966,12977
2022-02-08T20:49:29.172T,DATA,12966,12900,12967,12977
2022-02-08T20:49:29.172T,DATA,12967,12900,12968,12977
2022-02-08T20:49:29.172T,DATA,12968,12900,12969,12977
2022-02-08T20:49:29.172T,DATA,12969,12900,12970,12977
2022-02-08T20:49:29.172T,DATA,12970,12900,12971,12977
2022-02-08T20:49:29.172T,DATA,12971,12900,12972,12977
2022-02-08T20:49:29.172T,DATA,12972,12900,12973,12977
2022-02-08T20:49:29.172T,DATA,12973,12900,12974,12977
2022-02-08T20:49:29.172T,DATA,12974,12900,12975,12977
2022-02-08T20:49:29.172T,DATA,12975,12900,12976,12977
2022-02-08T20:49:29.172T,DATA,12976,12900,12977,12977
2022-02-08T20:49:29.174T,ACK,12976,12900,12977,12977
(base) dongzihao@dongzihaoMacBook-Pro Assignment_3 % diff ./out1.txt ./bin/out.t
xt
(base) dongzihao@dongzihaoMacBook-Pro Assignment_3 %
```

d. Drop rate 0:

e. Drop rate 10

```
(base) dongzihao@eduroam-169-233-211-22 Assignment_3 % ./myserver 1024 10
2022-02-08T20:52:54.811T,DATA,0
2022-02-08T20:52:54.812T,DATA,9
2022-02-08T20:52:54.812T,DATA,15
2022-02-08T20:52:54.812T,DATA,20
2022-02-08T20:52:54.812T,DATA,22
2022-02-08T20:52:54.813T,DATA,58
2022-02-08T20:52:54.813T,DATA,52
2022-02-08T20:52:54.813T,DATA,59
2022-02-08T20:52:54.813T,DATA,64
2022-02-08T20:52:54.813T,DATA,67
2022-02-08T20:52:54.814T,DATA,10
2022-02-08T20:52:54.814T,DATA,13
2022-02-08T20:52:54.814T,DATA,14
2022-02-08T20:52:54.814T,DATA,19
2022-02-08T20:52:54.814T,DATA,27
2022-02-08T20:52:54.815T,DATA,36
2022-02-08T20:52:54.815T,DATA,37
2022-02-08T20:52:54.816T,DATA,50
2022-02-08T20:52:54.817T,DATA,55
2022-02-08T20:52:54.817T,DATA,66
2022-02-08T20:52:54.819T,DATA,53
2022-02-08T20:52:54.819T,DATA,62
2022-02-08T20:52:54.819T,DATA,65
*****recive finish storing file*****
save all
[]
2022-02-08T20:52:54.817T,DATA,65,0,66,72
2022-02-08T20:52:54.817T,DATA,66,0,67,72
2022-02-08T20:52:54.818T,DATA,67,0,68,72
2022-02-08T20:52:54.818T,DATA,68,0,69,72
2022-02-08T20:52:54.818T,DATA,69,0,70,72
2022-02-08T20:52:54.818T,DATA,70,0,71,72
2022-02-08T20:52:54.818T,DATA,71,0,72,72
2022-02-08T20:52:54.818T,ACK,49,0,50,72
2022-02-08T20:52:54.818T,DATA,50,50,51,72
2022-02-08T20:52:54.818T,DATA,51,50,52,72
2022-02-08T20:52:54.818T,DATA,52,50,53,72
2022-02-08T20:52:54.818T,DATA,53,50,54,72
2022-02-08T20:52:54.818T,DATA,54,50,55,72
2022-02-08T20:52:54.818T,DATA,55,50,56,72
2022-02-08T20:52:54.818T,DATA,56,50,57,72
2022-02-08T20:52:54.818T,DATA,57,50,58,72
2022-02-08T20:52:54.818T,DATA,58,50,59,72
2022-02-08T20:52:54.818T,DATA,59,50,60,72
2022-02-08T20:52:54.818T,DATA,60,50,61,72
2022-02-08T20:52:54.818T,DATA,61,50,62,72
2022-02-08T20:52:54.818T,DATA,62,50,63,72
2022-02-08T20:52:54.818T,DATA,63,50,64,72
2022-02-08T20:52:54.818T,DATA,64,50,65,72
2022-02-08T20:52:54.818T,DATA,65,50,66,72
2022-02-08T20:52:54.818T,DATA,66,50,67,72
2022-02-08T20:52:54.818T,DATA,67,50,68,72
2022-02-08T20:52:54.818T,DATA,68,50,69,72
2022-02-08T20:52:54.819T,DATA,69,50,70,72
2022-02-08T20:52:54.819T,DATA,70,50,71,72
2022-02-08T20:52:54.819T,DATA,71,50,72,72
2022-02-08T20:52:54.819T,ACK,71,50,72,72
(base) dongzihao@dongzihaoMacBook-Pro Assignment_3 %
```

f. Drop 50:

```
2022-02-08T20:53:54.268T,DATA,16
2022-02-08T20:53:54.268T,DATA,18
2022-02-08T20:53:54.261T,DATA,20
2022-02-08T20:53:54.261T,DATA,22
2022-02-08T20:53:54.261T,DATA,23
2022-02-08T20:53:54.261T,DATA,24
2022-02-08T20:53:54.261T,DATA,25
2022-02-08T20:53:54.261T,DATA,27
2022-02-08T20:53:54.261T,DATA,30
2022-02-08T20:53:54.261T,DATA,33
2022-02-08T20:53:54.261T,DATA,35
2022-02-08T20:53:54.261T,DATA,36
2022-02-08T20:53:54.261T,DATA,37
2022-02-08T20:53:54.359T,DATA,39
2022-02-08T20:53:54.359T,DATA,43
2022-02-08T20:53:54.359T,DATA,44
2022-02-08T20:53:54.359T,DATA,47
2022-02-08T20:53:54.359T,DATA,48
2022-02-08T20:53:54.359T,DATA,49
2022-02-08T20:53:54.359T,DATA,51
2022-02-08T20:53:54.359T,DATA,52
2022-02-08T20:53:54.359T,DATA,54
2022-02-08T20:53:54.359T,DATA,55
2022-02-08T20:53:54.359T,DATA,63
2022-02-08T20:53:54.359T,DATA,64
2022-02-08T20:53:54.359T,DATA,66
2022-02-08T20:53:54.359T,DATA,67
2022-02-08T20:53:54.359T,DATA,69
2022-02-08T20:53:54.359T,DATA,71
2022-02-08T20:53:54.359T,ACK,-1
client side error
[]
2022-02-08T20:53:54.359T,DATA,44,0,45,72
2022-02-08T20:53:54.359T,DATA,45,0,46,72
2022-02-08T20:53:54.359T,DATA,46,0,47,72
2022-02-08T20:53:54.359T,DATA,47,0,48,72
2022-02-08T20:53:54.359T,DATA,48,0,49,72
2022-02-08T20:53:54.359T,DATA,49,0,50,72
2022-02-08T20:53:54.359T,DATA,50,0,51,72
2022-02-08T20:53:54.359T,DATA,51,0,52,72
2022-02-08T20:53:54.359T,DATA,52,0,53,72
2022-02-08T20:53:54.359T,DATA,53,0,54,72
2022-02-08T20:53:54.359T,DATA,54,0,55,72
2022-02-08T20:53:54.359T,DATA,55,0,56,72
2022-02-08T20:53:54.359T,DATA,56,0,57,72
2022-02-08T20:53:54.359T,DATA,57,0,58,72
2022-02-08T20:53:54.359T,DATA,58,0,59,72
2022-02-08T20:53:54.359T,DATA,59,0,60,72
2022-02-08T20:53:54.359T,DATA,60,0,61,72
2022-02-08T20:53:54.359T,DATA,61,0,62,72
2022-02-08T20:53:54.359T,DATA,62,0,63,72
2022-02-08T20:53:54.359T,DATA,63,0,64,72
2022-02-08T20:53:54.359T,DATA,64,0,65,72
2022-02-08T20:53:54.359T,DATA,65,0,66,72
2022-02-08T20:53:54.359T,DATA,66,0,67,72
2022-02-08T20:53:54.359T,DATA,67,0,68,72
2022-02-08T20:53:54.359T,DATA,68,0,69,72
2022-02-08T20:53:54.359T,DATA,69,0,70,72
2022-02-08T20:53:54.359T,DATA,70,0,71,72
2022-02-08T20:53:54.359T,DATA,71,0,72,72
time out
2022-02-08T20:53:59.361T,ACK,-1,0,0,72
0 resend over 5 time
(base) dongzihao@dongzihaoMacBook-Pro Assignment_3 %
```

g. Drop 70:

```
Terminal: Local Local (2) + v
2022-02-08T20:55:09.705T,DATA,27
2022-02-08T20:55:09.705T,DATA,29
2022-02-08T20:55:09.705T,DATA,30
2022-02-08T20:55:09.705T,DATA,33
2022-02-08T20:55:09.705T,DATA,35
2022-02-08T20:55:09.705T,DATA,36
2022-02-08T20:55:09.705T,DATA,37
2022-02-08T20:55:09.705T,DATA,39
2022-02-08T20:55:09.705T,DATA,43
2022-02-08T20:55:09.705T,DATA,44
2022-02-08T20:55:09.705T,DATA,45
2022-02-08T20:55:09.705T,DATA,47
2022-02-08T20:55:09.705T,DATA,48
2022-02-08T20:55:09.705T,DATA,49
2022-02-08T20:55:09.705T,DATA,51
2022-02-08T20:55:09.705T,DATA,52
2022-02-08T20:55:09.705T,DATA,54
2022-02-08T20:55:09.705T,DATA,55
2022-02-08T20:55:09.705T,DATA,56
2022-02-08T20:55:09.705T,DATA,59
2022-02-08T20:55:09.705T,DATA,60
2022-02-08T20:55:09.705T,DATA,62
2022-02-08T20:55:09.705T,DATA,63
2022-02-08T20:55:09.705T,DATA,64
2022-02-08T20:55:09.705T,DATA,65
2022-02-08T20:55:09.705T,DATA,66
2022-02-08T20:55:09.705T,DATA,67
2022-02-08T20:55:09.705T,DATA,69
2022-02-08T20:55:09.705T,DATA,71
2022-02-08T20:55:09.705T,ACK,-1
client side error

2022-02-08T20:55:09.704T,DATA,44,0,45,72
2022-02-08T20:55:09.704T,DATA,45,0,46,72
2022-02-08T20:55:09.704T,DATA,46,0,47,72
2022-02-08T20:55:09.704T,DATA,47,0,48,72
2022-02-08T20:55:09.704T,DATA,48,0,49,72
2022-02-08T20:55:09.704T,DATA,49,0,50,72
2022-02-08T20:55:09.704T,DATA,50,0,51,72
2022-02-08T20:55:09.704T,DATA,51,0,52,72
2022-02-08T20:55:09.704T,DATA,52,0,53,72
2022-02-08T20:55:09.704T,DATA,53,0,54,72
2022-02-08T20:55:09.704T,DATA,54,0,55,72
2022-02-08T20:55:09.704T,DATA,55,0,56,72
2022-02-08T20:55:09.704T,DATA,56,0,57,72
2022-02-08T20:55:09.704T,DATA,57,0,58,72
2022-02-08T20:55:09.704T,DATA,58,0,59,72
2022-02-08T20:55:09.704T,DATA,59,0,60,72
2022-02-08T20:55:09.704T,DATA,60,0,61,72
2022-02-08T20:55:09.704T,DATA,61,0,62,72
2022-02-08T20:55:09.704T,DATA,62,0,63,72
2022-02-08T20:55:09.704T,DATA,63,0,64,72
2022-02-08T20:55:09.704T,DATA,64,0,65,72
2022-02-08T20:55:09.704T,DATA,65,0,66,72
2022-02-08T20:55:09.704T,DATA,66,0,67,72
2022-02-08T20:55:09.704T,DATA,67,0,68,72
2022-02-08T20:55:09.704T,DATA,68,0,69,72
2022-02-08T20:55:09.704T,DATA,69,0,70,72
2022-02-08T20:55:09.704T,DATA,70,0,71,72
2022-02-08T20:55:09.704T,DATA,71,0,72,72
time out
2022-02-08T20:55:14.706T,ACK,-1,0,0,72
0 resend over 5 time
(base) dongzihao@dongzihaoMacBook-Pro Assignment_3 %
```

h. Drop 100:

```
2022-02-08T20:56:36.862T,DATA,43
2022-02-08T20:56:36.862T,DATA,44
2022-02-08T20:56:36.862T,DATA,45
2022-02-08T20:56:36.862T,DATA,46
2022-02-08T20:56:36.862T,DATA,47
2022-02-08T20:56:36.862T,DATA,48
2022-02-08T20:56:36.862T,DATA,49
2022-02-08T20:56:36.862T,DATA,50
2022-02-08T20:56:36.862T,DATA,51
2022-02-08T20:56:36.862T,DATA,52
2022-02-08T20:56:36.862T,DATA,53
2022-02-08T20:56:36.863T,DATA,54
2022-02-08T20:56:36.863T,DATA,55
2022-02-08T20:56:36.863T,DATA,56
2022-02-08T20:56:36.863T,DATA,57
2022-02-08T20:56:36.863T,DATA,58
2022-02-08T20:56:36.863T,DATA,59
2022-02-08T20:56:36.863T,DATA,60
2022-02-08T20:56:36.863T,DATA,61
2022-02-08T20:56:36.863T,DATA,62
2022-02-08T20:56:36.863T,DATA,63
2022-02-08T20:56:36.863T,DATA,64
2022-02-08T20:56:36.863T,DATA,65
2022-02-08T20:56:36.863T,DATA,66
2022-02-08T20:56:36.863T,DATA,67
2022-02-08T20:56:36.863T,DATA,68
2022-02-08T20:56:36.863T,DATA,69
2022-02-08T20:56:36.863T,DATA,70
2022-02-08T20:56:36.863T,DATA,71
2022-02-08T20:56:36.863T,ACK,-1
client side error

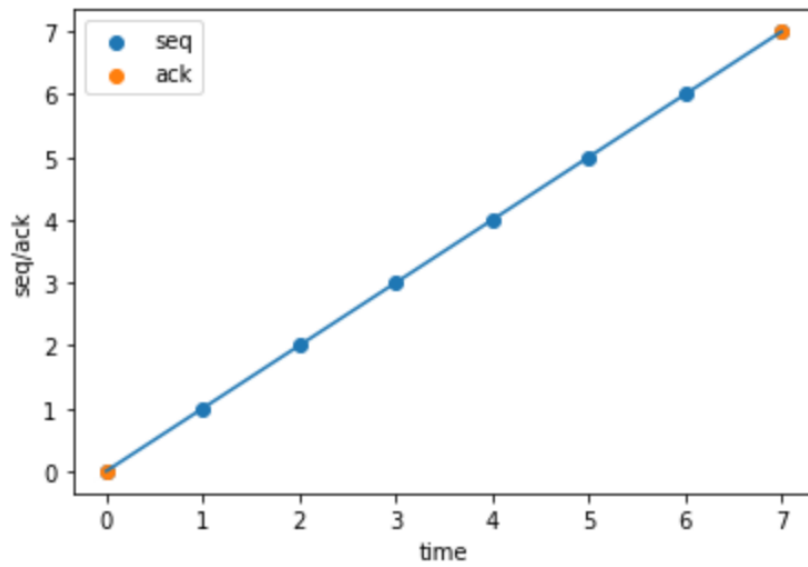
2022-02-08T20:56:36.862T,DATA,44,0,45,72
2022-02-08T20:56:36.862T,DATA,45,0,46,72
2022-02-08T20:56:36.862T,DATA,46,0,47,72
2022-02-08T20:56:36.862T,DATA,47,0,48,72
2022-02-08T20:56:36.862T,DATA,48,0,49,72
2022-02-08T20:56:36.862T,DATA,49,0,50,72
2022-02-08T20:56:36.862T,DATA,50,0,51,72
2022-02-08T20:56:36.862T,DATA,51,0,52,72
2022-02-08T20:56:36.862T,DATA,52,0,53,72
2022-02-08T20:56:36.862T,DATA,53,0,54,72
2022-02-08T20:56:36.863T,DATA,54,0,55,72
2022-02-08T20:56:36.863T,DATA,55,0,56,72
2022-02-08T20:56:36.863T,DATA,56,0,57,72
2022-02-08T20:56:36.863T,DATA,57,0,58,72
2022-02-08T20:56:36.863T,DATA,58,0,59,72
2022-02-08T20:56:36.863T,DATA,59,0,60,72
2022-02-08T20:56:36.863T,DATA,60,0,61,72
2022-02-08T20:56:36.863T,DATA,61,0,62,72
2022-02-08T20:56:36.863T,DATA,62,0,63,72
2022-02-08T20:56:36.863T,DATA,63,0,64,72
2022-02-08T20:56:36.863T,DATA,64,0,65,72
2022-02-08T20:56:36.863T,DATA,65,0,66,72
2022-02-08T20:56:36.863T,DATA,66,0,67,72
2022-02-08T20:56:36.863T,DATA,67,0,68,72
2022-02-08T20:56:36.863T,DATA,68,0,69,72
2022-02-08T20:56:36.863T,DATA,69,0,70,72
2022-02-08T20:56:36.863T,DATA,70,0,71,72
2022-02-08T20:56:36.863T,DATA,71,0,72,72
time out
2022-02-08T20:56:41.864T,ACK,-1,0,0,72
0 resend over 5 time
(base) dongzihao@dongzihaoMacBook-Pro Assignment_3 %
```

i. Graph with normal condition:

```
(base) dongzihao@eduroam-169-233-211-22 Assignment_3 % ./myserver 1024 0
*****receive finish storing file*****
save all

(base) dongzihao@dongzihaoMacBook-Pro Assignment_3 % ./myclient 127.0.0.1 1024 2
000 10 ./bin/myclient.o ./out2.txt
2022-02-08T20:57:54.914T,DATA,0,0,1,8
2022-02-08T20:57:54.916T,DATA,1,0,2,8
2022-02-08T20:57:54.916T,DATA,2,0,3,8
2022-02-08T20:57:54.916T,DATA,3,0,4,8
2022-02-08T20:57:54.916T,DATA,4,0,5,8
2022-02-08T20:57:54.916T,DATA,5,0,6,8
2022-02-08T20:57:54.916T,DATA,6,0,7,8
2022-02-08T20:57:54.916T,DATA,7,0,8,8
2022-02-08T20:57:54.916T,ACK,7,0,8,8
(base) dongzihao@dongzihaoMacBook-Pro Assignment_3 %
```

Graph:



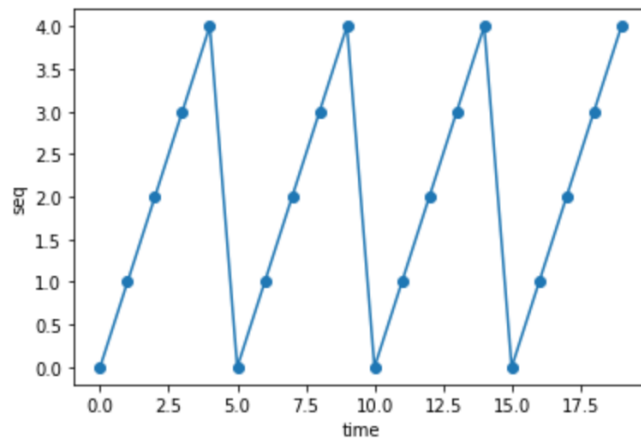
li. Graph with 100% drop rate:

Example: 100 drop rate with window 4:

```

2022-02-08T21:03:55.985T,DATA,0
2022-02-08T21:03:55.986T,DATA,1
2022-02-08T21:03:55.986T,DATA,2
2022-02-08T21:03:55.986T,DATA,3
2022-02-08T21:03:55.986T,ACK,-1
2022-02-08T21:03:40.987T,DATA,0
2022-02-08T21:03:40.987T,DATA,1
2022-02-08T21:03:40.987T,DATA,2
2022-02-08T21:03:40.987T,DATA,3
2022-02-08T21:03:40.987T,ACK,-1
2022-02-08T21:03:45.988T,DATA,0
2022-02-08T21:03:45.988T,DATA,1
2022-02-08T21:03:45.988T,DATA,2
2022-02-08T21:03:45.988T,DATA,3
2022-02-08T21:03:45.988T,ACK,-1
2022-02-08T21:03:50.988T,DATA,0
2022-02-08T21:03:50.988T,DATA,1
2022-02-08T21:03:50.988T,DATA,2
2022-02-08T21:03:50.988T,DATA,3
2022-02-08T21:03:50.988T,ACK,-1
2022-02-08T21:03:55.989T,DATA,0
2022-02-08T21:03:55.989T,DATA,1
2022-02-08T21:03:55.989T,DATA,2
2022-02-08T21:03:55.989T,DATA,3
2022-02-08T21:03:55.989T,ACK,-1
2022-02-08T21:04:00.991T,DATA,0
2022-02-08T21:04:00.991T,DATA,1
2022-02-08T21:04:00.991T,DATA,2
2022-02-08T21:04:00.991T,DATA,3
2022-02-08T21:04:00.991T,ACK,-1
client side error
2022-02-08T21:03:40.987T,DATA,0,0,1,4
2022-02-08T21:03:40.987T,DATA,1,0,2,4
2022-02-08T21:03:40.987T,DATA,2,0,3,4
2022-02-08T21:03:40.987T,DATA,3,0,4,4
time out
2022-02-08T21:03:45.988T,ACK,-1,0,0,4
2022-02-08T21:03:45.988T,DATA,0,0,1,4
2022-02-08T21:03:45.988T,DATA,1,0,2,4
2022-02-08T21:03:45.988T,DATA,2,0,3,4
2022-02-08T21:03:45.988T,DATA,3,0,4,4
time out
2022-02-08T21:03:50.988T,ACK,-1,0,0,4
2022-02-08T21:03:50.988T,DATA,0,0,1,4
2022-02-08T21:03:50.988T,DATA,1,0,2,4
2022-02-08T21:03:50.988T,DATA,2,0,3,4
2022-02-08T21:03:50.988T,DATA,3,0,4,4
time out
2022-02-08T21:03:55.989T,ACK,-1,0,0,4
2022-02-08T21:03:55.989T,DATA,0,0,1,4
2022-02-08T21:03:55.989T,DATA,1,0,2,4
2022-02-08T21:03:55.989T,DATA,2,0,3,4
2022-02-08T21:03:55.989T,DATA,3,0,4,4
time out
2022-02-08T21:04:00.991T,ACK,-1,0,0,4
2022-02-08T21:04:00.991T,DATA,0,0,1,4
2022-02-08T21:04:00.991T,DATA,1,0,2,4
2022-02-08T21:04:00.991T,DATA,2,0,3,4
2022-02-08T21:04:00.991T,DATA,3,0,4,4
time out
2022-02-08T21:04:05.993T,ACK,-1,0,0,4
0 resend over 5 time
(base) dongrihao@dongrihaoMacBook-Pro Assignment_3 %

```



There is no ack because it has being dropped