SRT411 Assignment 2

Rj kn'Mlpi

Cr tkn'37."4239

Introduction to the 6 step Information visualization process

Uvgr "3<"F ghlpg"vj g"Rtqdngo o'Vj g"r tqdngo "uj qwf "dg"wug/ecug"f tkxgp."pqv'f cvc"f tkxgp o'
Cpuy gt."y j cv'f q"{ qw'pggf "vq"wpf gtuvcpf A"Y j cv'f q"{ qw'gzr gev'vq"uggA"Y j cv'y qwrf "{ qw'
rkng"vq"uggA

Uvgr "4<"Cuuguu"cxcknrdng"F cvc o'Y j cv'v[r g"qh'f cvc"f q"{ qw'pggf "vq"cpuy gt"vj g"
chqtgo gpvkqpgf "s wguvkqpuA"Y j cv'r kgecu"qh'f cvc"f q"{ qw'pggf A

Uvgr "5<"Rtqeguu"kphqto cvkqp o'Hqto cv'vj g"f cvc"kpvq"c"wucdng"hqto cv'hqt"i tcr j kecn'i gpgtcvkpi
tguqwtegu"vq"y qtm'y kj o'Kh"{ qw'j cxg"co dki wqwu"hkgnfu"cff "o gvc"f cvc"vq"vj g"hkgnfu"y j kej "
gzr nckp"vj g"o gcpkpi "qh'kxo'Vj gp"r ctug"vj g"f cvc"kpvq"c"f cvcdcug"kp"c"wucdng"hqto cv o'
Hwtvj gto qtg"{ qw'o c{"pggf "vq"cff "cff kvkqpcn'f cvc."hkgnfu."qt"qvj gt"kphqto cvkqp"hrqo "
qwwukf g"vj g"mi "hkng."uwej "cu"i gqi tcr j kecn'mecvkqp o[qw'o c{"cnuq"y cpv'vq"ew'qw'r kgecu"qh'
kphqto cvkqp"vj cv'{ qw'f qpv"pggf o'Ci i tgi cvkqp<'kv'kpxqnxgu"vj g"uwo o ctk[cvkqp"qh'f cvc"
r qkpvu"kp"vj g"kpvgtguv'qh'uko r nkh{ kpi "vj kpi u"uq"vj cv'r cwgtpu"kp"vj g"f cvc"ecp"dg"dgwug"uggp"kp"
vj g"i tcr j o'Hqt"gzco r ng"hqt"uqo g"i tcr j u"{ qw'uj qy "cp"cxgtci g"qxgt"vko g."cpf "uqo gvko gu"
{ qw'i tqwr "f cvc"d{ "c"eqnngevkqp"qh'r qtw"kpuvgcf "qh'gcej "r qtv o'Ceq o o qp"r tqdngo "y kj "eux"
f cvc"ku"kh"{ qwr'f cvc"r qkpu"j cxg"c"xctkgf "pwo dgt"qh'tqngu."kv'ku"f khhkewn'vq"eqo r ev'vj g"
o cej kpgu"d{ "tqngu o'C"uqnwvkqp"vq"vj ku"ku"qpn{"wukpi "vj g"o quv'ko r qtvcpv."qt"r tko ct{."tqng"dw"
vj gp"uqo g"kphqto cvkqp"i gw"nquw

Uvgr "6<"Xkuwcn'Vtcpuhqto cvkqp o'Qpeg"{ qw'j cxg"qdvckpgf "cn'vj g"kphqto cvkqp"{ qw'y cpv'kp"c"
EUX"hkng"vj g"pgzv'uvgr "ku"o cr r kpi "vj g"f cvc"kpvq"uqo g"xkuwcn'uvtwewwtg"vj cv'r tqf wegu"c"
i tcr j ke"tgr tgugpvcvkqp o'kg"c"uecwgt"r nqv o'J gtg"{ qw'uj qwrf "ej qqug"c"i tcr j "y j kej "ecp"dguv'
tgr tgugpv'{ qwt"f cvc o'Vj g"r nko ct{ "f ko gpukqp"ku"vj g"hkpf kpi u"y j kej "{ qw'y cpv'vq"eqpxg{ o'
{ qwf "r kng"c"i tcr j "vq"f go o qpuvcvg o'Vj g"ukk g"cpf "uj cr g"qh'vj g"i tcr j u"ctg"ko r qtvcpv o'{ qw'
y cpv'kv'vq"dg"cu"uo cn'cu"r quukdng"y j kng"dgkpi "ngi kdng"cpf "cu{"vq"wpf gtuvcpf o'Eqnqt"ecp"dg"
wugf "hqt"y q"r wtr quguo'Hktuv'kv'ecp"dg"wugf "vq"f khhgtgpvkcvg"xctkqwu"r ctvu"qh'c"i tcr j o'Hqt"
gzco r ng"kh"qpg"pqf g"kp"c"i tcr j "ku"tgf "cpf "vj g"tguv'ctg"i tggp"vj g"tgf "pqf g"uj qwf "
eqo r ngvgn{"f khhgtgpv'kphqto cvkqp o'Wug"vj g"hktuv'eqnqt"ceeqtf kpi "vq"hwpevkqp."cpf "vj gp"vj g"
ugeqpf "uj qwf "eqpvtcuv'kv'vq"j ki j nki j v'ur gekhke"f cvc"r qkpuo

Uvgr "7<"Xkgy "Vtcpuhqto cvkqp o'Wuwcn{"cv'vj ku"r qkpv."vj g"i tcr j "ku"pqv'eqorngug."cv'vj ku"r qkpv'
y g"gpf "wr "y kj "vqq"o cp{"f cvc"r qkpuo'Eqo o qpn{"kphqto cvkqp"ku"nquv'vj tqwi j "hknvgtkpi ."dw"
uqo gvko gu"kphqto cvkqp"ecp"dg"uwo o ctk[gf "kpuvgcf "qh'nquw

Uvgr "8<"Kpvgtr tgv'cpf "F gekf go'D{ "pqy "y kv'Xkgy "vtcpuhqto cvkqp"{ qw'xg"etgcvgf "o wnkr ng"
i tcr j u"qp"vj g"tgngxcpv'f cvc o'P qy "{ qw'qwi j v'vq"dg"enquki "kp"qpg"hkpcn'i tcr j "vj cv'ucvkuhkgu"
qwt"kpkvkcn'qdlgevkxguo'Kh"{ qw'xg"qdvckpgf "vj g"hkpcn'i tcr j ."cn'{ qw'o wuv'f q"ku"tgcf "kvo

Beginning the process

Step 1:

Y j cu''vj g''f kllgtgpeg''dgvy ggp''VQT''dtqy ulkpi ''cpf ''tgi wrt''dtqy ulkpi ''lp ''vgto u''qh''r qtv'
wuci g◌

%%◌Uvgr ''4◌''Kpggf ''uco r ngu''qh''c''VQT''dtqy ulkpi ''uguulkqp''cpf ''c''J VO N''dtqy ulkpi ''uguulkqp◌'
Ur gelkhecm{ ''Kpggf ''vq''cpcn{ g''c''f kllgtgpeg''lp''r tqvqeqn''wugf ◌

Ktcp''y ktg''uj ctmy j krg''dtqy ulkpi ''vj g''y gd''cu''dqvj ''VQT''cpf ''vj g''tgi wrt''dtqy ugt.''y j krg''
vtcemlkpi ''vj g''r qtu''%%◌Uvgr 5◌''Keqmpgevgf ''uo g''y ktguj ctm''f cvc''f wtlkpi ''c''dtqy ulkpi ''uguulkqp''
qp''vj g''tgi wrt''dtqy ugt''cpf ''ucxgf ''kv''cu''◌Tgi dtqy ulkpi ◌ecr pi ◌λ◌''Kvj gp''cp''vj g''dgmqy ''uj ctm
eqo o cpf ''vq''i gv''c''eux''hwm''qh''vj g''r tqvqeqn''wugf ◌

wuj ctm''/t''Tgi dtqy ulkpi ◌ecr pi ''/V''hlgrf u''/g''lk◌ote''/g''lk◌f uv'/g''a y ◌eqmRtqvqeqn''/G''j gcf gt? {
/G''ugr ctcvqt? .@''tgi dtqy ulkpi ◌eux

Kvj gp''wugf ''vj g''dgmqy ''r{ vj qp''uetkr v''vq''ugr ctcvg''vj g''ugpv''r cemgwu''r tqvqeqn''htqo ''vj g''
tgegkxgf ''r cemgwu''r tqvqeqm◌

%#◌fwutrdlkpr {''vj qp5 ◌''pgy hkrg? qr gp*$uteugpvgi $.''$y $+''pgy hkrgoy tkrg*$r tqvqeqñp$+''
pgy hkrg4? qr gp*$f uvugpvgi $.$y $+''pgy hkrg4oy tkrg*$r tqvqeqñp$+''y kj ''
qr gp*$rj qo givtwo r rF qewo gpwrUTV633 Cuu4rtgi dtqy ulkpi ◌eux$+''cu''h◌hqt''rkpg''lp''h◌lkh'
rkpgour rkv*$.$+]2_? ? $3; 4◌3 8: ◌3; $''cpf ''rkpgour rkv*$.$+]3 _# ''$$''cpf ''rkpgour rkv*$.$+]4_# p◌'
pgy hkrgoy tkrg*rkpgour rkv*$.$+]4_+''r tkpv*$3 $+
gmug◌lkh''rkpgour rkv*$.$+]3 _? ? $3; 4◌3 8: ◌3; $''cpf ''rkpgour rkv*$.$+]2_# $$''cpf ''rkpgour rkv*$.$+]4_#
? p◌''r tkpv*4+''pgy hkrg4oy tkrg*rkpgour rkv*$.$+]4_+''/////

Keqmpgevgf ''uo g''y ktguj ctm''f cvc''f wtlkpi ''c''dtqy ulkpi ''uguulkqp''qp''VQT''cpf ''ucxgf ''kv''cu''
◌Vqtdtqy ulkpi ◌ecr pi λ''Kvj gp''tcp''vj g''dgmqy ''uj ctm◌eqo o cpf ''vq''i gv''c''eux''hwm''qh''vj g''
r tqvqeqn''wugf ◌

wuj ctm''/t''Vqtdtqy ulkpi ◌ecr pi ''/V''hlgrf u''/g''lk◌ote''/g''lk◌f uv'/g''a y ◌eqmRtqvqeqñ/G''j gcf gt? {''
/G''ugr ctcvqt? .@''vqtdtqy ulkpi ◌eux

I then used the below python script to separate the sent packets protocols from the received packetse protocols.

%#◌fwutrdlkpr {''vj qp5 ◌''pgy hkrg? qr gp*$uteugpwqt$.''$y $+''pgy hkrgoy tkrg*$r tqvqeqñp$+''
pgy hkrg4? qr gp*$f uvugpwqt$.$y $+''pgy hkrg4oy tkrg*$r tqvqeqñp$+''y kj ''
qr gp*$rj qo givtwo r rF qewo gpwrUTV633 Cuu4rvqtdtqy ulkpi ◌eux$+''cu''h◌hqt''rkpg''lp''h◌lkh'
rkpgour rkv*$.$+]2_? ? $3; 4◌3 8: ◌3; $''cpf ''rkpgour rkv*$.$+]3 _# ''$$''cpf ''rkpgour rkv*$.$+]4_# p◌'
pgy hkrgoy tkrg*rkpgour rkv*$.$+]4_+''r tkpv*$3 $+
gmug◌lkh''rkpgour rkv*$.$+]3 _? ? $3; 4◌3 8: ◌3; $''cpf ''rkpgour rkv*$.$+]2_# $$''cpf ''rkpgour rkv*$.$+]4_#
? p◌''r tkpv*4+''pgy hkrg4oy tkrg*rkpgour rkv*$.$+]4_+''//////

Kvj gp''dtqwi j v''vj g''r tqf wegf ''hlgrgu''lpvq''T.''cpf ''wugf ''vj g''cdrg''hwpevlkqp''vq''uo o ctlk g''vj go ◌'
Vj g''xctlkcdrgu''uvctv''qhl''y kj ''vj g''dtqy ugt''mpf ''*vt+''hqt''VQTrtgi wrt.''hqmqy gf ''d{ ''vj g''
f ktgelkqp''*vt+''hqt''ugpvrtgelkgxgf ◌O cmlkpi ''vqr''ugpv''dgeqo lpi ''u◌''Kvj gp''twp''cdrg''vq''
uo o ctlk g''vj go

```
ts< - read.csv2 ("/home/trump/Documents/SRT411Ass2/dstsenttor" )
table (ts )

## ts
##    SSL  SSLv2    TCP TLSv1.2    UDP
##     33   1185   9628     22      4

tr< - read.csv2 ("/home/trump/Documents/SRT411Ass2/srcsenttor" )
table (tr)

## tr
## IGMPv3  LLMNR   NBNS   SSDP    TCP TLSv1.2    UDP
##     2      4      3      2   3187      7     11

rr< - read.csv2 ("/home/trump/Documents/SRT411Ass2/srcsentreg" )
table (rr)

## rr
## IGMPv3   SSDP    TCP TLSv1.2    UDP
##     3      4   1293      3      5

rs< - read.csv2 ("/home/trump/Documents/SRT411Ass2/dstsentreg" )
table (rs )

## rs
##    TCP TLSv1.2    UDP
##   5560    540      2
```

Step 4:

Kʼvj gp"vq"uxctvʼo cf g"c"dct"i tcrj "hqt"gcej "qhʼvj go "vq"tgr tgugpvʼvj g"rtqrqtvkqpu"qhʼgcej "
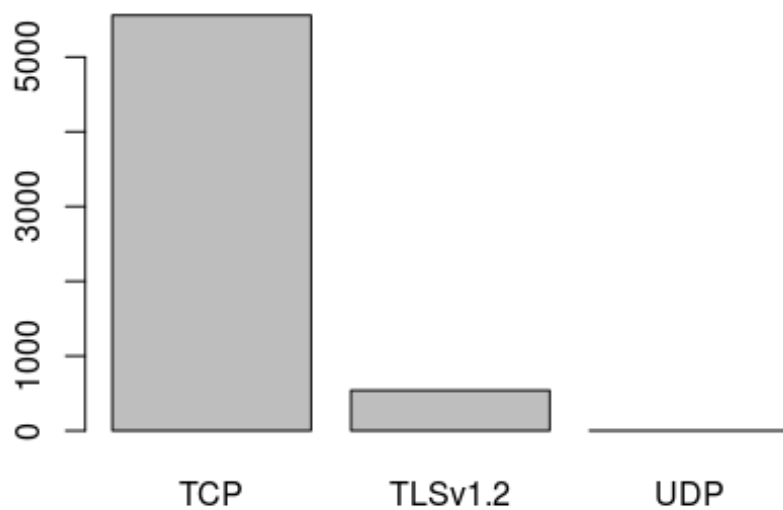rtqvqeqmᴏ

```
barplot (table (ts ))
```
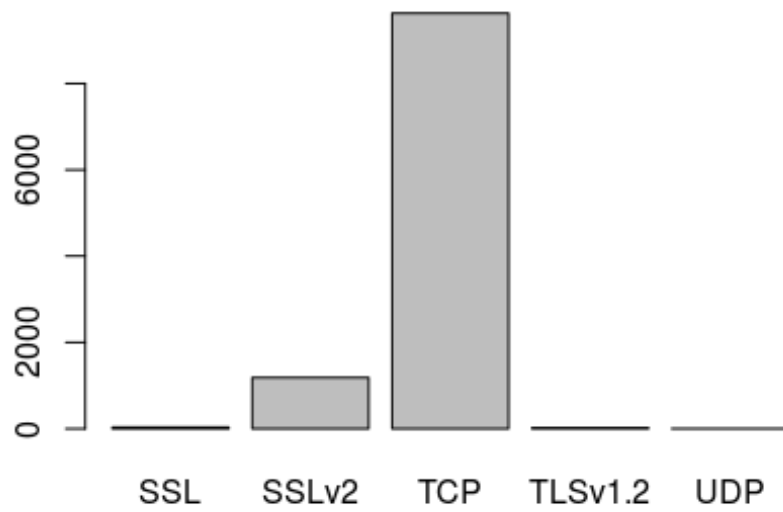
barplot(table(tr))
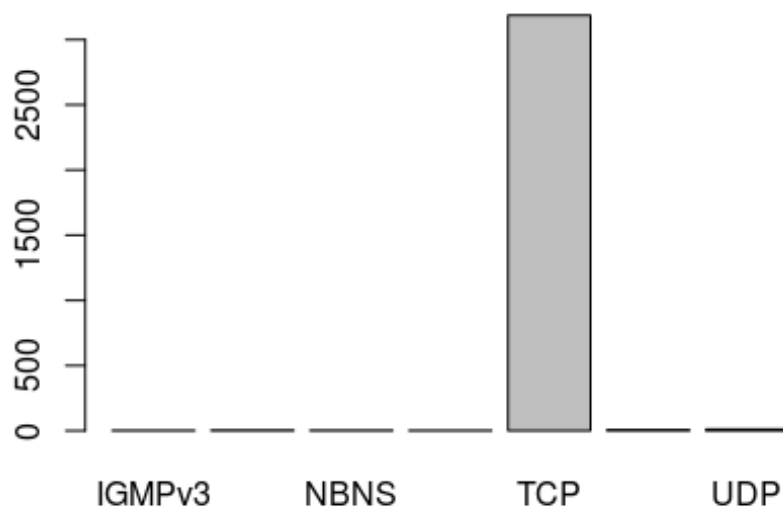
barplot(table(rr))
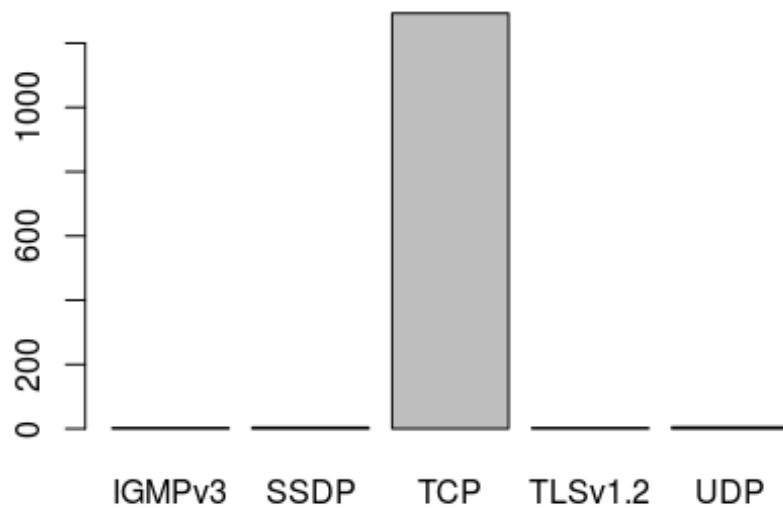
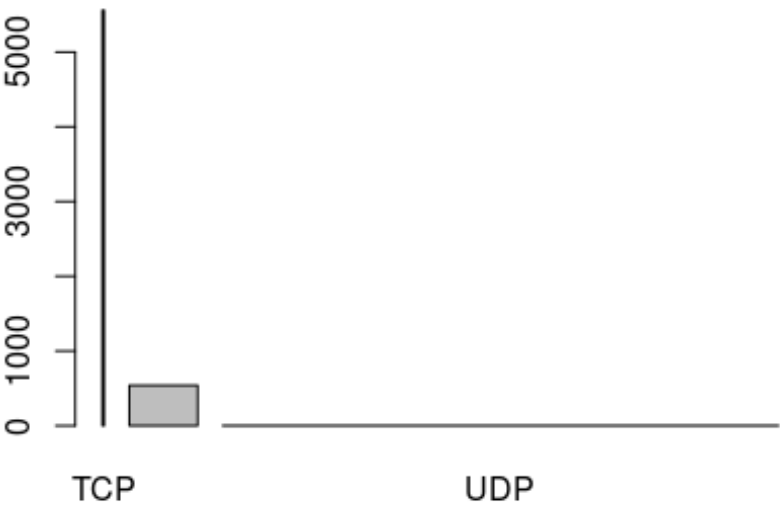`barplot(table(rs))`

"Kvj gp"
vtlgf "vq"o cng"c"eqo r ctcvkxg"dctr nqv"wulpi "dctr nqv*vcdng*tu+.vcdng*vu++."dw"vj ku"r tqxgf "pqv"
wughwn"cu"vj g"uco r ngu"uk gu"y gtg"pqv"gs wcn"lp "uk go
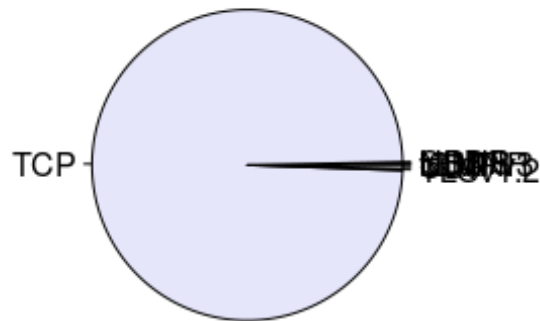
```r
barplot(table(rs),table(ts))
```


"Ko wuv"
eqpxgtv'vj g"tcy "pwo dgtu"vq"r gtegpvci gu."qt"wug"c"f kligtgpv'i tcr j "Kvj gp"vtkgf "Rkg"i tcr j u"
Vj g"tguwnu"r tqxgf "j ctf "vq"tgcf "kp"uqo g"ecugu."cpf "vj g"f cvc"uvknf qgu"pqv"eqo r ctg"ci ckpuv"
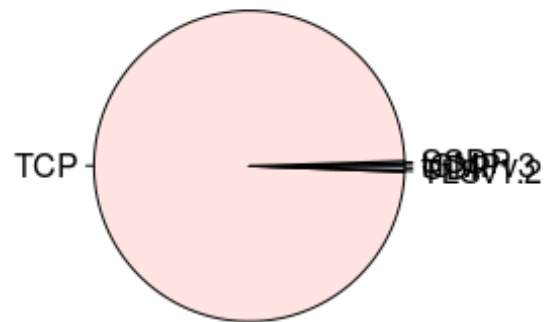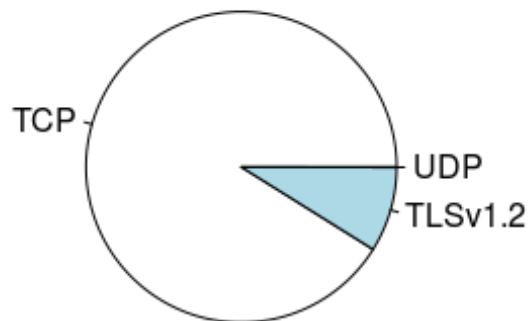gcej "qvj gto

```r
pie(table(ts))
```
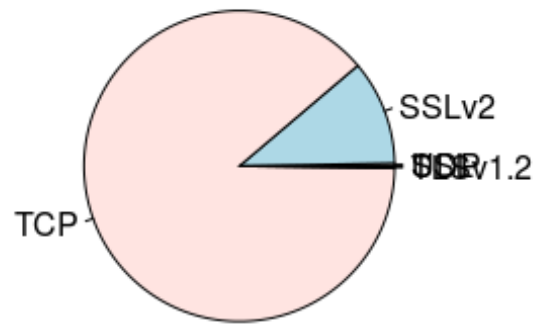
pie (table (tr))

pie (table (rr))

`pie(table(rs))`

"Kvj gp"

wugf "edlpf "vq "eqpxgtv "vj g "eqwpvu "lpvq "r gtegpvci guo

```r
tbl <- table(ts)
tss <- cbind(tbl, prop.table(tbl))
tss

##         tbl
## SSL       33 0.0030353201
## SSLv2   1185 0.1089955850
## TCP     9628 0.8855776306
## TLSv1.2   22 0.0020235467
## UDP        4 0.0003679176

tbl <- table(tr)
trs <- cbind(tbl, prop.table(tbl))
trs

##         tbl
## IGMPv3     2 0.0006218905
## LLMNR      4 0.0012437811
## NBNS       3 0.0009328358
## SSDP       2 0.0006218905
## TCP     3187 0.9909825871
## TLSv1.2    7 0.0021766169
## UDP       11 0.0034203980

tbl <- table(rr)
rrs <- cbind(tbl, prop.table(tbl))
rrs

##         tbl
## IGMPv3     3 0.002293578
## SSDP       4 0.003058104
## TCP     1293 0.988532110
## TLSv1.2    3 0.002293578
## UDP        5 0.003822630

tbl <- table(rs)
rss <- cbind(tbl, prop.table(tbl))
rss

##         tbl
## TCP     5560 0.9111766634
## TLSv1.2  540 0.0884955752
## UDP        2 0.0003277614
```

Step 5:

Y j krg"vt{ kpi "vq"o cng"c"eqo r ctcvkxg"dctr nv"Kpqvkegf"vj g"pwo dgt"qh"tqy u"fkfp)v"o cvej ."uq Ko cpwcn{"cf f gf"tqy u"y kj "2)u"cpf "vj g"o kuukpi "r tqvqeqn"Kvj gp"tgmqcf gf"vj go ."cpf " etgcvgf"4"pgy "nkuvu"Vj g"pgy "nkuv"pqy "j cxg"vj g"ugpf gt"vqtrtgi wct"vcdng"f cvc"kp"qpg"vcdng" cpf "vj g"tgekgxgt"vqtrtgi wct"vcdng"f cvc"kp"cpqvj gt"vcdngo

```r
library(plotly)
```

```
## Loading required package: ggplot2

##
## Attaching package: 'plotly'

## The following object is masked from 'package:ggplot2':
##
##     last_plot

## The following object is masked from 'package:stats':
##
##     filter

## The following object is masked from 'package:graphics':
##
##     layout

rrs<-read.csv2("/home/trump/Documents/SRT411Ass2/rrs",sep=",")
trs<-read.csv2("/home/trump/Documents/SRT411Ass2/trs",sep=",")
rss<-read.csv2("/home/trump/Documents/SRT411Ass2/rss",sep=",")
tss<-read.csv2("/home/trump/Documents/SRT411Ass2/tss",sep=",")
trrs<-mutate(trs,rrs=rrs[,3])
trss<-mutate(tss,rss=rss[,3])
```

Step 6:

Pqy "Kj cxg"gxgt{ vj lpi "r tgr ctgf "vq "o cng"vj g"eqo r ctcvkxg"dcti tcr j ő Dgmy "ku"vj g"
r gtegpvci g"eqo r ctkuqp "qh"r tqvqeqnı "uggp "lp "vj g"tgelgxgf "r cengu"qh"vj g"VQT"cpf "tgi wnt"
dtqy ugt "f cvcő Y j cv"ku"y lpguug f "ku"vj e"f lhfgtgpv"f kutklwklqp "qh"vj g"r tqvqeqnı

```
Protocol<-trrs$protocol
Torrs<-trrs$perc
Regrs<-trrs$rrs
plot_ly(trrs, x = ~ Protocol, y = ~ Torrs, type = 'bar', name = 'Torrs') %>%
 add_trace(y = ~ Regrs, name = 'Regrs') %>%
 layout(yaxis = list(title = 'Count'), barmode = 'group')
```
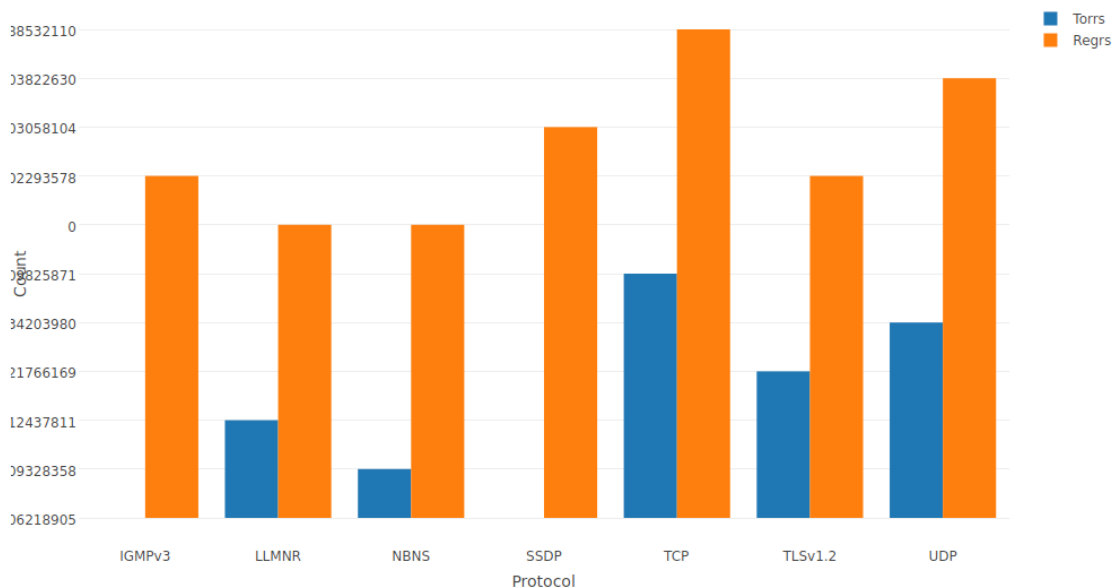
Dgmy "ku"vj g"r gtegpvci g"eqo r ctkuqp"qh"r tqvqequ"uggp"kp"vj g"ugpv"r cengwu"qh"vj g"VQT"cpf "tgi wrct"dtqy ugt"f cvc

```r
Protocol <- trss$protocol
Torss <- trss$perc
Regss <- trss$rss


plot_ly(trss, x = ~Protocol, y = ~Torss, type = 'bar', name = 'Torss') %>%
  add_trace(y = ~Regss, name = 'Regss') %>%
  layout(yaxis = list(title = 'Count'), barmode = 'group')
```