2017-18 Academic Year CLICC Laptops

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Part 1) Refine Raw Data

```
library(readr)
library(stringr)
library(knitr)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(ggplot2)
library(tidyr)

Laptops <- read_csv("~/Downloads/1718 AY Laptops RAW.csv")
```

```
## Warning: Duplicated column names deduplicated: 'PATRON_GROUP_DISPLAY' =>
## 'PATRON_GROUP_DISPLAY_1' [3]
```

```
## Parsed with column specification:
## cols(
##   INSTITUTION_ID = col_character(),
##   PATRON_GROUP_DISPLAY = col_character(),
##   PATRON_GROUP_DISPLAY_1 = col_character(),
##   PATRON_STAT_CODE = col_character(),
##   ITEM_ENUM = col_character(),
##   CHARGE_DATE = col_character(),
##   CHARGE_PLACE = col_character(),
##   DISCHARGE_DATE = col_character(),
##   DISCHARGE_PLACE = col_character()
## )
```

```
#Convert times into POSIX time
Laptops$CHARGE_DATE <- strptime(Laptops$CHARGE_DATE, format = "%m/%d/%Y %I:%M %p")
Laptops$DISCHARGE_DATE <- strptime(Laptops$DISCHARGE_DATE, format = "%m/%d/%Y %I:%M %p")
#Include hyphen in display name
Laptops[which(Laptops$ITEM_ENUM == "POW16"),"ITEM_ENUM"] <- "POW-16"
#Only include charges made during the 3 quarters
Laptops <- subset(Laptops, (Laptops$CHARGE_DATE >= as.POSIXct("2017-10-02 00:01:00") &
    Laptops$CHARGE_DATE <= as.POSIXct("2017-12-15 00:01:00")) | (Laptops$CHARGE_DATE >= as.POSIXct("2018
    Laptops$CHARGE_DATE <= as.POSIXct("2018-03-23 00:01:00")) | (Laptops$CHARGE_DATE >= as.POSIXct("2018
    Laptops$CHARGE_DATE <= as.POSIXct("2018-06-15 00:01:00")))
```

Part 2) Item Usage

A1) Number of checkouts by quarter

```
#Subset laptops by quarter
LaptopsF17 <- subset(Laptops, Laptops$CHARGE_DATE >= as.POSIXct("2017-10-02 00:01:00") &
               Laptops$CHARGE_DATE <= as.POSIXct("2017-12-15 00:01:00"))
LaptopsW18 <- subset(Laptops, Laptops$CHARGE_DATE >= as.POSIXct("2018-01-08 00:01:00") &
               Laptops$CHARGE_DATE <= as.POSIXct("2018-03-23 00:01:00"))
LaptopsS18 <- subset(Laptops, Laptops$CHARGE_DATE >= as.POSIXct("2018-04-02 00:01:00") &
               Laptops$CHARGE_DATE <= as.POSIXct("2018-06-15 00:01:00"))

data.frame(c(nrow(LaptopsF17),nrow(LaptopsW18),nrow(LaptopsS18),(nrow(LaptopsF17)+nrow(LaptopsW18)+nrow
           row.names = c("Fall 2017", "Winter 2018", "Spring 2018","'17-18 Academic Year")) %>%
           setNames("Frequency") %>% kable(caption="Number of Laptop Checkouts by Quarter")
```

Table 1: Number of Laptop Checkouts by Quarter

	Frequency
Fall 2017	24703
Winter 2018	24319
Spring 2018	23217
'17-18 Academic Year	72239

A2) Number of checkouts by location

```
Laptops$CHARGE_PLACE %>% table %>% sort(decreasing = T) %>%
  kable(caption="Number of Laptop Checkouts by Location")
```

Table 2: Number of Laptop Checkouts by Location

.	Freq
CLICC Powell	32396
CLICC YRL	18751
CLICC SEL Boelter	8799
CLICC Biomed	8600
CLICC Music	1831
CLICC Arts	1737
CLICC Classrooms	125

A3) Number of checkouts by location AND quarter

```
f <- LaptopsF17$CHARGE_PLACE %>% table %>% data.frame()
w <- LaptopsW18$CHARGE_PLACE %>% table %>% data.frame()
s <- LaptopsS18$CHARGE_PLACE %>% table %>% data.frame()
```

```
laptopsdf <- merge(f, w, by=".", all.y = T) %>% merge(., s, by = ".") %>%
             setNames(c("Location", "Fall 2017", "Winter 2018", "Spring 2018")) %>%
             mutate_if(is.numeric, funs(ifelse(is.na(.), 0, .)))
#Make a new dataframe to include the entire academic year
laptopsdf1 <- laptopsdf
laptopsdf1$`'17-18 Academic Year` <- apply(laptopsdf1[2:4], 1, sum)
laptopsdf1 %>% kable(caption="Number of Laptop Checkouts by Location and Quarter")
```

Table 3: Number of Laptop Checkouts by Location and Quarter

Location	Fall 2017	Winter 2018	Spring 2018	'17-18 Academic Year
CLICC Arts	544	618	575	1737
CLICC Biomed	2594	3216	2790	8600
CLICC Classrooms	0	105	20	125
CLICC Music	574	617	640	1831
CLICC Powell	11111	10832	10453	32396
CLICC SEL Boelter	3395	2786	2618	8799
CLICC YRL	6485	6145	6121	18751

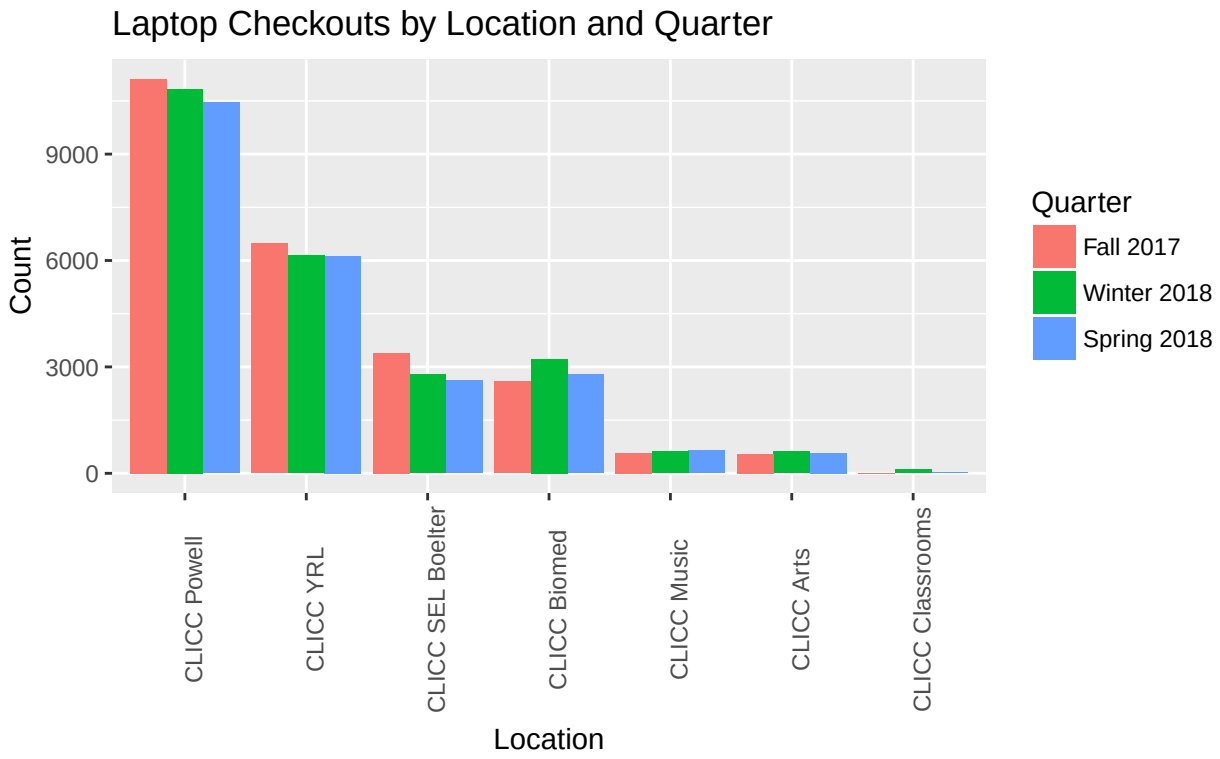
B) Graphs

```
library(reshape2)
```

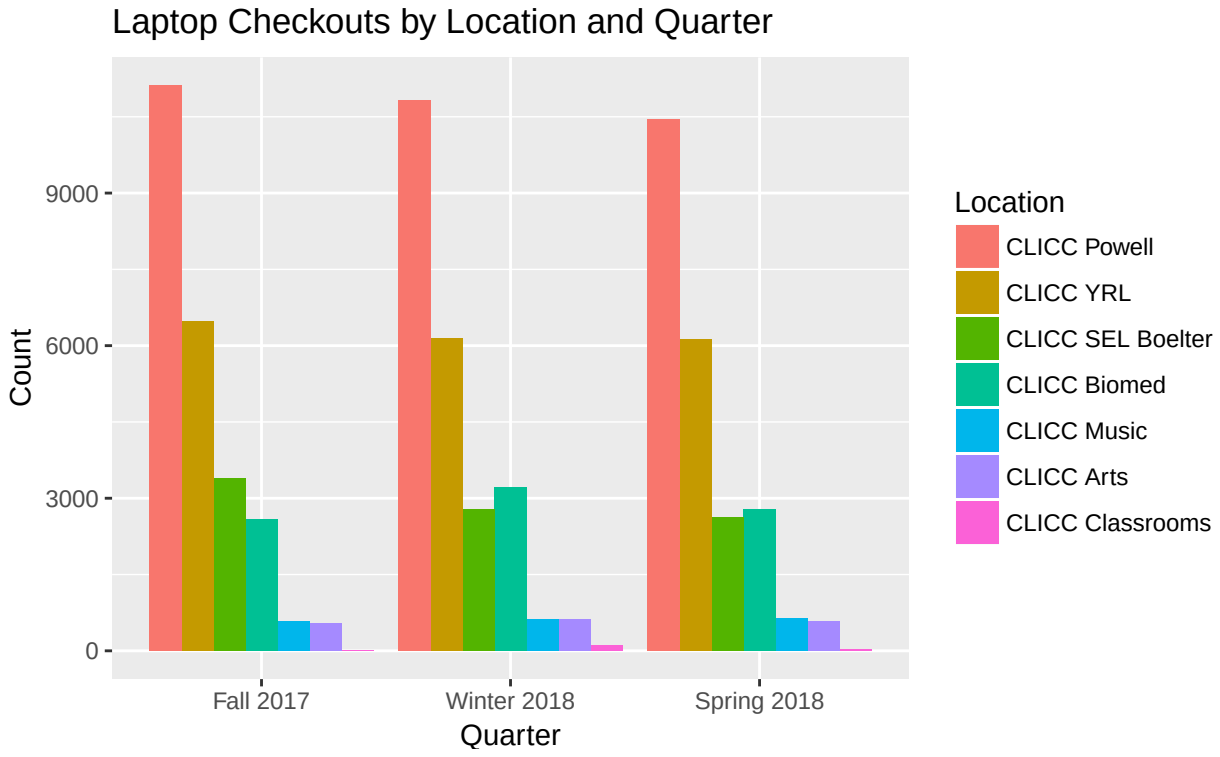
```
##
## Attaching package: 'reshape2'
```

```
## The following object is masked from 'package:tidyr':
##
##     smiths
```

```
laptopsdf2 <- melt(laptopsdf, id.vars=c("Location"))
#Reorder the factor levels
laptopsdf2$Location <- reorder(laptopsdf2$Location, X=desc(laptopsdf2$value))

ggplot(laptopsdf2, aes(x=Location, y=value, group=variable, fill=variable)) +
  geom_col(position="dodge") +
  ggtitle("Laptop Checkouts by Location and Quarter") +
  ylab("Count") +
  theme(axis.text.x = element_text(angle = 90)) +
  scale_fill_discrete(name = "Quarter")
```




```
ggplot(laptopsdf2, aes(x=variable, y=value, group=Location, fill=Location)) +
  geom_col(position="dodge") +
  ggtitle("Laptop Checkouts by Location and Quarter") +
  ylab("Count") +
  xlab("Quarter") +
  scale_fill_discrete(name = "Location")
```



Item Usage for Individual Laptops by Location

C1) Number of Powell Lending Laptop Rentals by Barcode

```
a <- LaptopsF17[str_detect(LaptopsF17$ITEM_ENUM, "POW"),"ITEM_ENUM"] %>% table() %>% data.frame
b <- LaptopsW18[str_detect(LaptopsW18$ITEM_ENUM, "POW"),"ITEM_ENUM"] %>% table() %>% data.frame
c <- LaptopsS18[str_detect(LaptopsS18$ITEM_ENUM, "POW"),"ITEM_ENUM"] %>% table() %>% data.frame
powlaptops <- merge(a, b, by=".") %>% merge(., c, by = ".") %>% setNames(c("Barcode", "Fall 2017", "Win
powlaptops$`'17-18 Academic Year` <- apply(powlaptops[2:4], 1, sum)
powlaptops %>% kable(caption="Number of Powell Laptop Rentals by Barcode throughout the '17-18 Academic
```

Table 4: Number of Powell Laptop Rentals by Barcode throughout the '17-18 Academic Year

Barcode	Fall 2017	Winter 2018	Spring 2018	'17-18 Academic Year
POW-01	96	80	80	256
POW-02	93	81	86	260
POW-03	94	91	99	284
POW-04	91	69	96	256
POW-05	99	54	94	247
POW-06	82	87	88	257
POW-07	64	98	56	218
POW-08	79	83	75	237
POW-09	96	127	103	326
POW-10	159	120	100	379
POW-12	151	116	91	358
POW-13	138	117	111	366
POW-14	130	140	98	368
POW-15	109	107	69	285
POW-16	97	131	104	332
POW-17	152	137	118	407
POW-18	136	148	106	390
POW-19	143	146	124	413
POW-20	136	155	136	427
POW-21	157	129	87	373
POW-22	120	144	122	386
POW-23	122	133	115	370
POW-24	109	130	95	334
POW-25	112	129	100	341
POW-26	119	123	80	322
POW-27	114	121	111	346
POW-28	109	106	65	280
POW-29	99	119	104	322
POW-30	97	113	103	313
POW-31	101	109	124	334
POW-32	82	102	98	282
POW-33	78	73	93	244
POW-34	67	76	103	246
POW-35	73	87	92	252
POW-36	73	74	70	217
POW-37	69	78	66	213
POW-38	63	69	96	228
POW-39	65	68	87	220

Barcode	Fall 2017	Winter 2018	Spring 2018	'17-18 Academic Year
POW-40	67	63	92	222
POW-41	67	60	82	209
POW-42	75	80	103	258
POW-43	91	79	100	270
POW-44	78	74	93	245
POW-45	119	111	126	356
POW-46	133	94	114	341
POW-47	110	133	133	376
POW-48	138	122	138	398
POW-49	119	111	119	349
POW-51	151	139	125	415
POW-52	156	156	156	468
POW-53	110	95	109	314
POW-54	109	117	77	303
POW-55	148	128	114	390
POW-56	88	115	141	344
POW-57	74	72	108	254
POW-58	73	91	114	278
POW-59	78	97	87	262
POW-60	92	86	107	285
POW-61	108	105	120	333
POW-62	101	106	102	309
POW-63	94	114	125	333
POW-64	129	110	118	357
POW-65	175	147	160	482
POW-66	188	166	164	518
POW-67	190	168	165	523
POW-68	181	183	160	524
POW-69	188	175	119	482
POW-70	154	187	149	490
POW-71	196	180	143	519
POW-72	182	177	169	528
POW-73	152	152	146	450
POW-74	147	136	130	413
POW-75	194	170	139	503
POW-76	161	153	119	433
POW-77	89	88	116	293
POW-78	71	108	116	295
POW-79	93	111	100	304
POW-80	92	108	94	294
POW-81	129	131	127	387
POW-82	137	114	151	402
POW-83	138	130	118	386
POW-84	143	126	151	420
POW-85	193	140	174	507
POW-86	193	183	176	552
POW-87	206	151	149	506
POW-88	149	177	168	494
POW-89	227	180	187	594
POW-90	212	191	183	586
POW-91	227	189	186	602
POW-92	222	183	146	551

***Note: Laptops with barcodes “POW-11” and “POW-50” were not used at all in the academic year.

C2) Number of YRL Laptop Rentals by Barcode

```
a <- LaptopsF17[str_detect(LaptopsF17$ITEM_ENUM, "YRL"),"ITEM_ENUM"] %>% table() %>% data.frame
b <- LaptopsW18[str_detect(LaptopsW18$ITEM_ENUM, "YRL"),"ITEM_ENUM"] %>% table() %>% data.frame
c <- LaptopsS18[str_detect(LaptopsS18$ITEM_ENUM, "YRL"),"ITEM_ENUM"] %>% table() %>% data.frame
yrllaptops <- merge(a, b, by=".", all=T) %>% merge(., c, by = ".", all=T) %>%
              setNames(c("Barcode", "Fall 2017", "Winter 2018", "Spring 2018")) %>%
              mutate_if(is.numeric, funs(ifelse(is.na(.), 0, .)))
yrllaptops$`'17-18 Academic Year` <- apply(yrllaptops[2:4], 1, sum)
yrllaptops %>% kable(caption="Number of YRL Laptop Rentals by Barcode throughout the '17-18 Academic Yea
```

Table 5: Number of YRL Laptop Rentals by Barcode throughout the ’17-18 Academic Year

Barcode	Fall 2017	Winter 2018	Spring 2018	’17-18 Academic Year
YRL-01	10	19	36	65
YRL-02	6	19	36	61
YRL-03	5	19	37	61
YRL-04	9	22	40	71
YRL-05	13	14	46	73
YRL-06	8	5	36	49
YRL-07	26	29	38	93
YRL-08	30	35	19	84
YRL-09	28	34	50	112
YRL-10	35	36	30	101
YRL-11	40	39	49	128
YRL-12	43	38	61	142
YRL-13	59	50	58	167
YRL-14	59	49	63	171
YRL-15	25	29	50	104
YRL-16	45	46	56	147
YRL-17	60	57	52	169
YRL-18	61	62	62	185
YRL-19	74	42	67	183
YRL-20	73	62	80	215
YRL-21	63	60	52	175
YRL-22	23	27	41	91
YRL-23	22	27	43	92
YRL-24	20	23	34	77
YRL-25	29	29	40	98
YRL-26	26	20	37	83
YRL-27	21	22	40	83
YRL-28	27	14	37	78
YRL-29	61	60	61	182
YRL-30	74	59	42	175
YRL-31	75	63	53	191
YRL-32	62	61	60	183
YRL-33	69	57	52	178
YRL-34	51	59	68	178
YRL-35	57	47	55	159

Barcode	Fall 2017	Winter 2018	Spring 2018	'17-18 Academic Year
YRL-36	95	75	60	230
YRL-37	108	68	62	238
YRL-38	98	83	70	251
YRL-39	96	89	71	256
YRL-40	97	82	54	233
YRL-41	80	67	55	202
YRL-42	61	53	58	172
YRL-43	39	32	45	116
YRL-44	49	49	51	149
YRL-45	54	58	63	175
YRL-46	62	64	53	179
YRL-47	62	63	75	200
YRL-48	70	54	60	184
YRL-49	87	84	46	217
YRL-50	103	87	66	256
YRL-51	109	109	77	295
YRL-52	118	121	87	326
YRL-53	137	123	100	360
YRL-54	114	83	78	275
YRL-55	95	93	87	275
YRL-56	117	86	98	301
YRL-57	128	120	87	335
YRL-58	138	130	115	383
YRL-59	146	130	87	363
YRL-60	136	131	103	370
YRL-61	88	59	83	230
YRL-62	94	97	76	267
YRL-63	95	93	90	278
YRL-64	109	107	86	302
YRL-65	115	104	95	314
YRL-66	96	89	83	268
YRL-67	141	139	94	374
YRL-68	116	160	126	402
YRL-69	163	164	134	461
YRL-70	171	164	125	460
YRL-72	172	153	135	460
YRL-73	180	142	69	391
YRL-74	191	140	127	458
YRL-75	171	174	147	492
YRL-76	180	168	154	502
YRL-77	180	161	154	495
YRL-78	99	150	154	403
YRL-79	1	0	17	18
YRL-80	1	6	23	30
YRL-81	4	8	38	50
YRL-82	2	11	30	43
YRL-83	4	7	19	30
YRL-84	7	14	40	61
YRL-85	9	14	28	51
YRL-86	47	58	64	169
YRL-87	55	60	69	184
YRL-88	65	68	81	214

Barcode	Fall 2017	Winter 2018	Spring 2018	'17-18 Academic Year
YRL-89	71	84	96	251
YRL-90	70	83	75	228
YRL-71	0	0	120	120

C3) Number of CLICC Biomed Laptop Rentals by Barcode

```
a <- LaptopsF17[str_detect(LaptopsF17$ITEM_ENUM, "BIO"),"ITEM_ENUM"] %>% table() %>% data.frame
b <- LaptopsW18[str_detect(LaptopsW18$ITEM_ENUM, "BIO"),"ITEM_ENUM"] %>% table() %>% data.frame
c <- LaptopsS18[str_detect(LaptopsS18$ITEM_ENUM, "BIO"),"ITEM_ENUM"] %>% table() %>% data.frame
biolaptops <- merge(a, b, by=".", all=T) %>% merge(., c, by = ".", all=T) %>% setNames(c("Barcode", "Fa
biolaptops$`'17-18 Academic Year` <- apply(biolaptops[2:4], 1, sum)
biolaptops %>% kable(caption="Number of CLICC Biomed Laptop Rentals by Barcode throughout the '17-18 Ac
```

Table 6: Number of CLICC Biomed Laptop Rentals by Barcode throughout the '17-18 Academic Year

Barcode	Fall 2017	Winter 2018	Spring 2018	'17-18 Academic Year
BIO-01	114	123	125	362
BIO-02	128	131	111	370
BIO-03	81	151	141	373
BIO-04	138	142	129	409
BIO-05	92	39	100	231
BIO-06	126	132	97	355
BIO-07	137	149	157	443
BIO-08	136	171	156	463
BIO-09	141	167	116	424
BIO-10	142	162	97	401
BIO-11	59	75	55	189
BIO-12	59	81	35	175
BIO-13	43	69	57	169
BIO-14	33	68	39	140
BIO-15	33	84	62	179
BIO-16	46	64	68	178
BIO-17	36	71	64	171
BIO-18	51	80	63	194
BIO-19	44	81	48	173
BIO-20	58	82	70	210
BIO-21	113	133	106	352
BIO-22	121	98	121	340
BIO-23	127	106	107	340
BIO-24	125	121	119	365
BIO-25	104	104	115	323
BIO-26	34	82	43	159
BIO-27	41	74	74	189
BIO-28	37	74	65	176
BIO-29	32	63	55	150
BIO-30	35	68	72	175
BIO-31	70	88	59	217
BIO-32	58	83	64	205

C4) Number of CLICC Arts Laptop Rentals by Barcode

```
a <- LaptopsF17[str_detect(LaptopsF17$ITEM_ENUM, "ART"),"ITEM_ENUM"] %>% table() %>% data.frame
b <- LaptopsW18[str_detect(LaptopsW18$ITEM_ENUM, "ART"),"ITEM_ENUM"] %>% table() %>% data.frame
c <- LaptopsS18[str_detect(LaptopsS18$ITEM_ENUM, "ART"),"ITEM_ENUM"] %>% table() %>% data.frame
artlaptops <- merge(a, b, by=".", all=T) %>% merge(., c, by = ".", all=T) %>% setNames(c("Barcode", "Fa
artlaptops$`'17-18 Academic Year` <- apply(artlaptops[2:4], 1, sum)
artlaptops %>% kable(caption="Number of CLICC Arts Laptop Rentals by Barcode throughout the '17-18 Acad
```

Table 7: Number of CLICC Arts Laptop Rentals by Barcode throughout the '17-18 Academic Year

Barcode	Fall 2017	Winter 2018	Spring 2018	'17-18 Academic Year
ART-01	31	46	53	130
ART-02	28	54	32	114
ART-03	22	48	40	110
ART-04	35	42	43	120
ART-05	37	47	43	127
ART-06	47	41	55	143
ART-07	54	59	46	159
ART-08	63	68	50	181
ART-09	75	66	67	208
ART-10	73	68	79	220
ART-11	79	79	67	225

C5) Number of CLICC Music Laptop Rentals by Barcode

```
a <- LaptopsF17[str_detect(LaptopsF17$ITEM_ENUM, "MUS"),"ITEM_ENUM"] %>% table() %>% data.frame
b <- LaptopsW18[str_detect(LaptopsW18$ITEM_ENUM, "MUS"),"ITEM_ENUM"] %>% table() %>% data.frame
c <- LaptopsS18[str_detect(LaptopsS18$ITEM_ENUM, "MUS"),"ITEM_ENUM"] %>% table() %>% data.frame
musiclaptops <- merge(a, b, by=".", all=T) %>% merge(., c, by = ".", all=T) %>% setNames(c("Barcode", "
musiclaptops$`'17-18 Academic Year` <- apply(musiclaptops[2:4], 1, sum)
musiclaptops %>% kable(caption="Number of CLICC Music Laptop Rentals by Barcode throughout the '17-18 A
```

Table 8: Number of CLICC Music Laptop Rentals by Barcode throughout the '17-18 Academic Year

Barcode	Fall 2017	Winter 2018	Spring 2018	'17-18 Academic Year
MUS-01	31	27	50	108
MUS-02	58	32	51	141
MUS-03	65	38	57	160
MUS-04	58	59	55	172
MUS-05	46	47	36	129
MUS-06	51	70	13	134
MUS-07	31	46	50	127
MUS-08	32	47	26	105
MUS-09	27	55	51	133
MUS-10	34	48	25	107
MUS-11	39	23	54	116
MUS-12	36	63	56	155
MUS-13	25	38	61	124

Barcode	Fall 2017	Winter 2018	Spring 2018	'17-18 Academic Year
MUS-14	41	24	55	120

C6) Number of CLICC Boelter Laptop Rentals by Barcode

```
library(stringr)
a <- LaptopsF17[str_detect(LaptopsF17$ITEM_ENUM, "BOE"),"ITEM_ENUM"] %>% table() %>% data.frame
b <- LaptopsW18[str_detect(LaptopsW18$ITEM_ENUM, "BOE"),"ITEM_ENUM"] %>% table() %>% data.frame
c <- LaptopsS18[str_detect(LaptopsS18$ITEM_ENUM, "BOE"),"ITEM_ENUM"] %>% table() %>% data.frame
boelterlaptops <- merge(a, b, by=".", all=T) %>% merge(., c, by = ".", all=T) %>% setNames(c("Barcode",
boelterlaptops$`'17-18 Academic Year` <- apply(boelterlaptops[2:4], 1, sum)
boelterlaptops %>% kable(caption="Number of CLICC Boelter Laptop Rentals by Barcode throughout the '17-
```

Table 9: Number of CLICC Boelter Laptop Rentals by Barcode throughout the '17-18 Academic Year

Barcode	Fall 2017	Winter 2018	Spring 2018	'17-18 Academic Year
BOE-01	130	140	135	405
BOE-02	125	126	118	369
BOE-03	129	115	112	356
BOE-04	130	121	133	384
BOE-05	111	129	134	374
BOE-06	113	122	128	363
BOE-07	112	119	112	343
BOE-08	136	136	113	385
BOE-09	134	138	132	404
BOE-10	167	151	123	441
BOE-11	39	20	35	94
BOE-12	47	20	15	82
BOE-13	38	19	22	79
BOE-14	37	20	25	82
BOE-15	40	17	18	75
BOE-16	48	24	25	97
BOE-17	50	37	28	115
BOE-18	52	30	34	116
BOE-19	53	30	22	105
BOE-20	64	35	56	155
BOE-21	114	75	125	314
BOE-22	131	138	111	380
BOE-23	167	132	99	398
BOE-24	169	107	105	381
BOE-25	161	125	115	401
BOE-26	44	28	27	99
BOE-27	52	31	20	103
BOE-28	70	37	25	132
BOE-29	70	41	31	142
BOE-30	73	53	47	173

C7) Number of CLICC Geology Laptop Rentals by Barcode

```
library(stringr)
a <- LaptopsF17[str_detect(LaptopsF17$ITEM_ENUM, "GEO"),"ITEM_ENUM"] %>% table() %>% data.frame
b <- LaptopsW18[str_detect(LaptopsW18$ITEM_ENUM, "GEO"),"ITEM_ENUM"] %>% table() %>% data.frame
c <- LaptopsS18[str_detect(LaptopsS18$ITEM_ENUM, "GEO"),"ITEM_ENUM"] %>% table() %>% data.frame
geologylaptops <- merge(a, b, by=".", all=T) %>% merge(., c, by = ".", all=T) %>% setNames(c("Barcode",
geologylaptops$`'17-18 Academic Year` <- apply(geologylaptops[2:4], 1, sum)
geologylaptops %>% kable(caption="Number of CLICC Geology Laptop Rentals by Barcode throughout the '17-
```

Table 10: Number of CLICC Geology Laptop Rentals by Barcode throughout the '17-18 Academic Year

Barcode	Fall 2017	Winter 2018	Spring 2018	'17-18 Academic Year
GEO-01	37	28	28	93
GEO-02	77	57	53	187
GEO-03	70	69	54	193
GEO-04	67	62	54	183
GEO-05	54	58	56	168
GEO-06	62	57	57	176
GEO-07	46	46	32	124
GEO-08	24	8	5	37
GEO-09	34	16	10	60
GEO-10	35	19	11	65
GEO-11	28	19	7	54
GEO-12	23	16	8	47
GEO-13	12	5	4	21
GEO-14	10	6	7	23
GEO-15	10	4	7	21

C8) Number of CLICC Classrooms Laptop Rentals by Barcode

```
library(stringr)
a <- LaptopsW18[str_detect(LaptopsW18$ITEM_ENUM, "CLB"),"ITEM_ENUM"] %>% table() %>% data.frame
b <- LaptopsS18[str_detect(LaptopsS18$ITEM_ENUM, "CLB"),"ITEM_ENUM"] %>% table() %>% data.frame
classlaptops <- merge(a, b, by=".", all=T) %>% setNames(c("Barcode", "Winter 2018", "Spring 2018")) %>%
                mutate_if(is.numeric, funs(ifelse(is.na(.), 0, .)))
classlaptops$`'17-18 Academic Year` <- apply(classlaptops[2:3], 1, sum)
classlaptops %>% kable(caption="Number of CLICC Classrooms Laptop Rentals by Barcode throughout the '17
```

Table 11: Number of CLICC Classrooms Laptop Rentals by Barcode throughout the '17-18 Academic Year

Barcode	Winter 2018	Spring 2018	'17-18 Academic Year
CLB-01	9	4	13
CLB-02	7	1	8
CLB-03	4	1	5
CLB-04	3	0	3
CLB-05	2	1	3
CLB-06	1	0	1
CLB-07	1	1	2

Barcode	Winter 2018	Spring 2018	'17-18 Academic Year
CLB-08	2	1	3
CLB-09	2	0	2
CLB-10	6	1	7
CLB-11	16	1	17
CLB-12	24	1	25
CLB-13	3	1	4
CLB-14	2	1	3
CLB-15	2	0	2
CLB-19	1	0	1
CLB-20	2	0	2
CLB-21	3	0	3
CLB-22	5	1	6
CLB-23	3	1	4
CLB-24	6	0	6
CLB-29	1	2	3
CLB-16	0	2	2

*__Note: Laptops with CLB barcodes were not available in Fall 2017 Quarter.__ Note: Laptops with barcodes "CLB-17", "CLB-18", "CLB-25", "CLB-26", "CLB-27" and "CLB-28" were not used at all in the academic year.

Part 3) Individual Users

```
a <- LaptopsF17$INSTITUTION_ID %>% table %>% sort(decreasing = T) %>% length
b <- LaptopsW18$INSTITUTION_ID %>% table %>% sort(decreasing = T) %>% length
c <- LaptopsS18$INSTITUTION_ID %>% table %>% sort(decreasing = T) %>% length

c(a, b, c, (a+b+c)) %>% as.data.frame(row.names = c("Fall 2017","Winter 2018","Spring 2018","'17-18 Aca
  setNames("Number of Individual Patrons") %>% kable(caption="Number of Individual Patrons throughout '
```

Table 12: Number of Individual Patrons throughout '17-18 Academic Year

	Number of Individual Patrons
Fall 2017	4762
Winter 2018	4696
Spring 2018	4754
'17-18 Academic Year	14212

Part 4) Time Analysis

```
library(lubridate)
```

```
##
## Attaching package: 'lubridate'
```

```
## The following object is masked from 'package:base':
```

```
##
##     date
```

```
#Create new variables for day of the week and hour in the day
Laptops$DAY_OF_WEEK <- Laptops$CHARGE_DATE %>% weekdays()
Laptops$HOUR <- Laptops$CHARGE_DATE %>% hour()
```

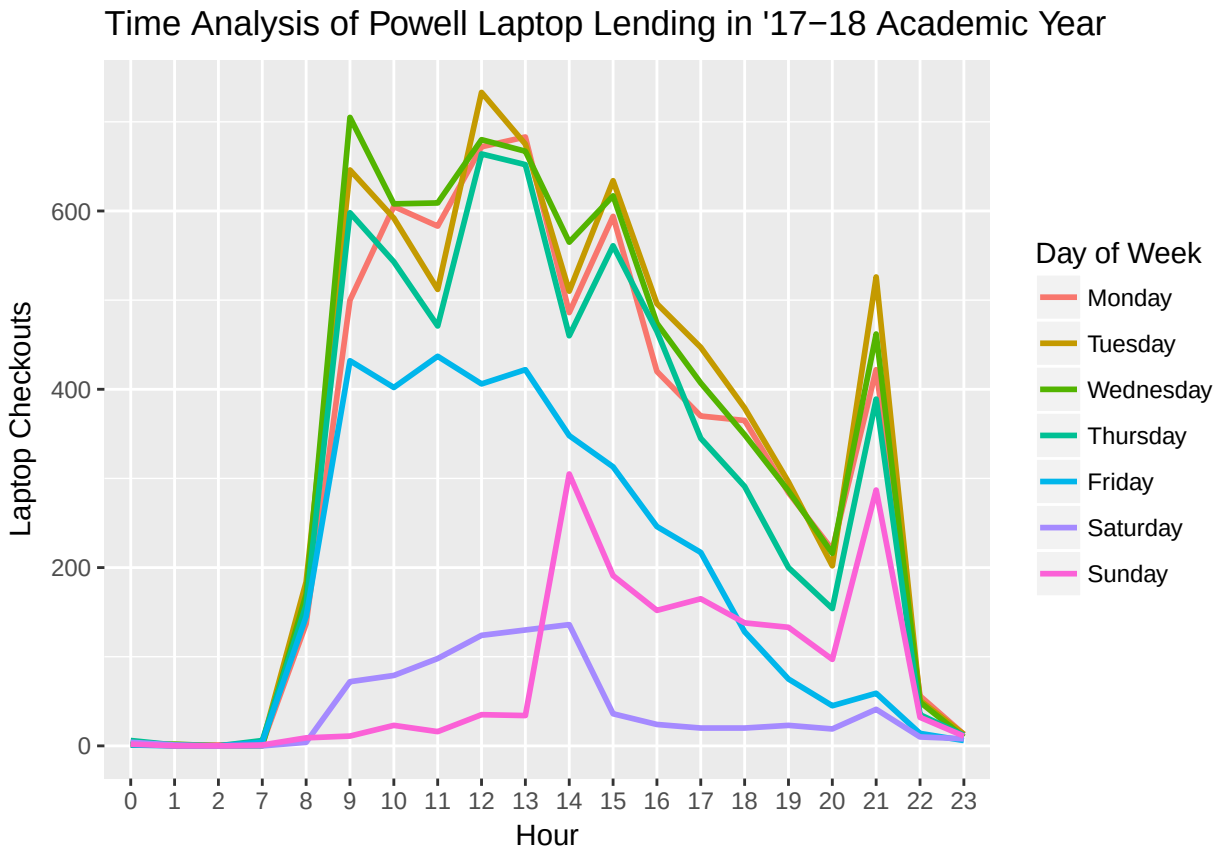
A) Powell Laptop Lending

```
powellLaptops <- Laptops[which(Laptops$CHARGE_PLACE=="CLICC Powell"),]

#Create data frame for a powell laptops time analysis
powellLaptops_time <- table(powellLaptops$HOUR, powellLaptops$DAY_OF_WEEK) %>% data.frame
names(powellLaptops_time) <- c("Hour","Day of Week","Laptop Checkouts")
powellLaptops_time$`Day of Week` <- factor(powellLaptops_time$`Day of Week`, levels = c("Monday", "Tues

#Table Representation with Hour
powellLaptops$HOUR %>% table %>% data.frame %>% setNames(c("Hour", "Laptop Checkouts")) %>%
  kable(caption="Number of Laptop Checkouts per Hour at Powell Lending")
```

Table 13: Number of Laptop Checkouts per Hour at Powell Lending

Hour	Laptop Checkouts
0	18
1	5
2	1
7	16
8	807
9	2964
10	2852
11	2726
12	3314
13	3263
14	2810
15	2946
16	2277
17	1971
18	1670
19	1297
20	953
21	2186
22	247
23	73

```
#Graphical representation
ggplot(powellLaptops_time, aes(x=Hour,y=`Laptop Checkouts`, group=`Day of Week`,color=`Day of Week`)) +
  geom_line(size=1) +
  ggtitle("Time Analysis of Powell Laptop Lending in '17-18 Academic Year")
```



***Note: On the x-axis, "0" indicates 12:00 AM, "13" indicates 1:00 PM, "14" indicates 2:00 PM, and so forth.

B) YRL Laptop Lending

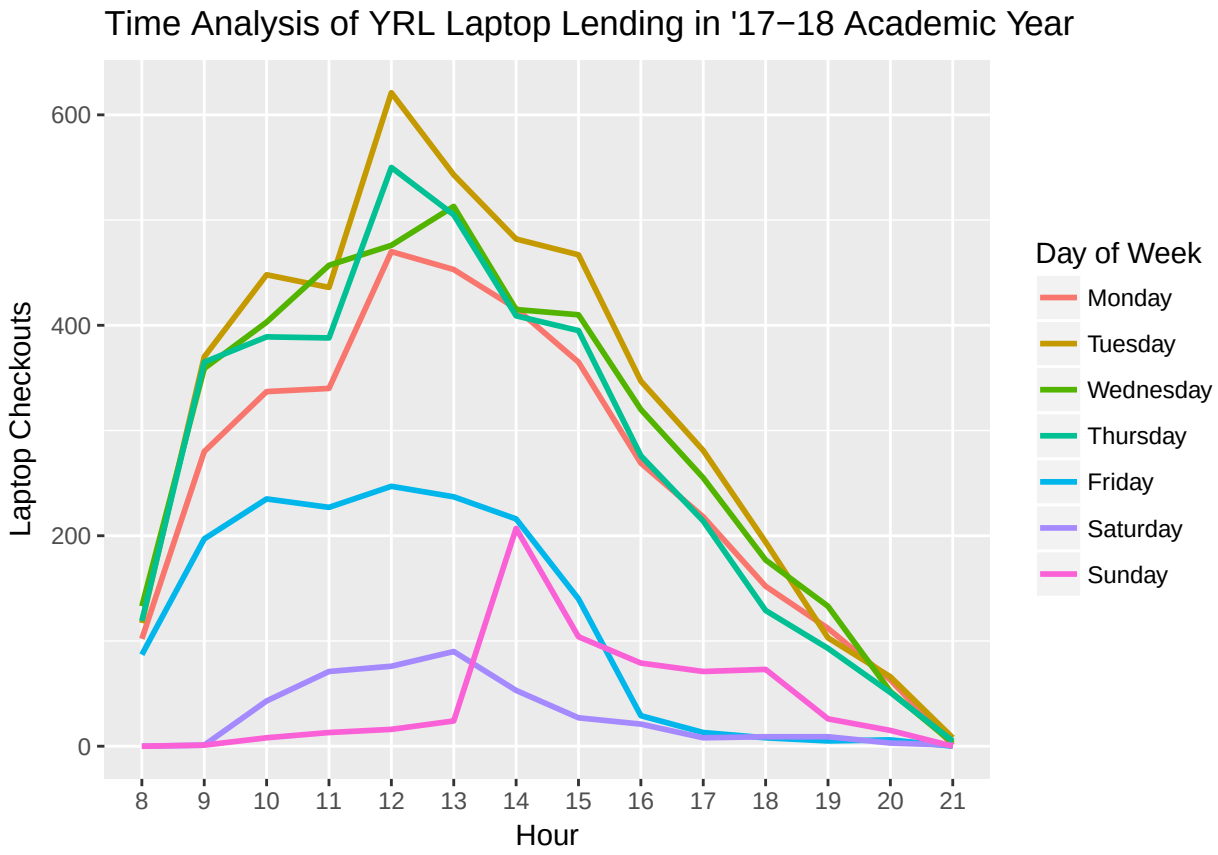
```
yrlLaptops <- Laptops[which(Laptops$CHARGE_PLACE=="CLICC YRL"),]

#Create data frame for a YRL laptops time analysis
yrlLaptops_time <- table(yrlLaptops$HOUR, yrlLaptops$DAY_OF_WEEK) %>% data.frame
names(yrlLaptops_time) <- c("Hour","Day of Week","Laptop Checkouts")
yrlLaptops_time$`Day of Week` <- factor(yrlLaptops_time$`Day of Week`, levels = c("Monday", "Tuesday",

#Table Representation with Hour
yrlLaptops$HOUR %>% table %>% data.frame %>% setNames(c("Hour", "Laptop Checkouts")) %>%
  kable(caption="Number of Laptop Checkouts per Hour at YRL")
```

Table 14: Number of Laptop Checkouts per Hour at YRL

Hour	Laptop Checkouts
8	558
9	1573
10	1863
11	1932
12	2456
13	2365

Hour	Laptop Checkouts
14	2198
15	1908
16	1341
17	1060
18	742
19	481
20	256
21	18

```
#Graphical representation
ggplot(yrlLaptops_time, aes(x=Hour,y=`Laptop Checkouts`, group=`Day of Week`,color=`Day of Week`)) +
  geom_line(size=1) +
  ggtitle("Time Analysis of YRL Laptop Lending in '17-18 Academic Year")
```



***Note: On the x-axis, "13" indicates 1:00 PM, "14" indicates 2:00 PM, and so forth.