

# Assignment3\_Q1

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24 November 2018

## Generate random list of 100 Options in a portfolio

```
df <- data.frame(type = sample(c("c", "p"), 100, replace = TRUE), strike = round(runif(100) * 100, 0),  
                 underlying = round(runif(100) * 100, 0), Time = 1, r = 0.01, b = 0, sigma = 0.3)
```

## Calculate each option's value in the portfolio

```
df2 <- data.frame()  
for(i in (1:nrow(df))){  
  optionRow = df[i,]  
  optionVaule = round(GBSOption(TypeFlag = optionRow[1,]$type, S = optionRow[1,]$underlying,  
                                X = optionRow[1,]$strike, Time = optionRow[1,]$Time, r = optionRow[1,]$r,  
                                b = optionRow[1,]$b, sigma = optionRow[1,]$sigma)@price,4)  
  optionRow <- mutate(optionRow, value = optionVaule)  
  df2 <- bind_rows(df2, optionRow)  
  next()  
}
```

Following is the list of options with values

```
kable(df2, caption="Option Portfolio")
```

Table 1: Option Portfolio

type	strike	underlying	Time	r	b	sigma	value
p	38	89	1	0.01	0	0.3	0.0115
p	85	81	1	0.01	0	0.3	11.9034
c	80	1	1	0.01	0	0.3	0.0000
p	49	59	1	0.01	0	0.3	2.5953
p	46	68	1	0.01	0	0.3	0.7458
c	96	90	1	0.01	0	0.3	8.2595
p	7	2	1	0.01	0	0.3	4.9503
c	58	32	1	0.01	0	0.3	0.1129
p	75	44	1	0.01	0	0.3	30.9470
c	13	51	1	0.01	0	0.3	37.6219
p	29	72	1	0.01	0	0.3	0.0046
p	43	70	1	0.01	0	0.3	0.3546
c	24	35	1	0.01	0	0.3	11.3158
p	73	44	1	0.01	0	0.3	29.0261
c	10	56	1	0.01	0	0.3	45.5423
p	41	40	1	0.01	0	0.3	5.2921
c	35	84	1	0.01	0	0.3	48.5206
c	90	32	1	0.01	0	0.3	0.0011
c	45	79	1	0.01	0	0.3	33.8682
c	53	30	1	0.01	0	0.3	0.1308

type	strike	underlying	Time	r	b	sigma	value
c	41	37	1	0.01	0	0.3	2.8885
p	78	99	1	0.01	0	0.3	3.1459
c	25	8	1	0.01	0	0.3	0.0001
c	35	8	1	0.01	0	0.3	0.0000
c	55	53	1	0.01	0	0.3	5.4328
c	57	30	1	0.01	0	0.3	0.0705
p	26	24	1	0.01	0	0.3	4.0448
p	98	9	1	0.01	0	0.3	88.1144
p	37	99	1	0.01	0	0.3	0.0024
c	10	52	1	0.01	0	0.3	41.5821
p	82	1	1	0.01	0	0.3	80.1940
c	96	5	1	0.01	0	0.3	0.0000
p	12	62	1	0.01	0	0.3	0.0000
p	91	34	1	0.01	0	0.3	56.4351
c	28	27	1	0.01	0	0.3	2.7750
p	65	75	1	0.01	0	0.3	4.2270
c	73	86	1	0.01	0	0.3	17.1728
c	24	5	1	0.01	0	0.3	0.0000
p	90	69	1	0.01	0	0.3	23.1876
p	100	31	1	0.01	0	0.3	68.3136
p	45	72	1	0.01	0	0.3	0.4214
c	20	6	1	0.01	0	0.3	0.0000
c	12	92	1	0.01	0	0.3	79.2040
p	21	67	1	0.01	0	0.3	0.0001
c	48	2	1	0.01	0	0.3	0.0000
c	97	15	1	0.01	0	0.3	0.0000
p	67	29	1	0.01	0	0.3	37.6321
c	59	59	1	0.01	0	0.3	6.9649
p	18	38	1	0.01	0	0.3	0.0159
c	74	88	1	0.01	0	0.3	18.0279
c	58	48	1	0.01	0	0.3	2.4980
c	53	96	1	0.01	0	0.3	42.7601
p	99	18	1	0.01	0	0.3	80.1940
p	27	38	1	0.01	0	0.3	0.5994
p	65	18	1	0.01	0	0.3	46.5324
p	37	40	1	0.01	0	0.3	3.2112
c	47	36	1	0.01	0	0.3	1.2439
p	94	1	1	0.01	0	0.3	92.0746
c	83	67	1	0.01	0	0.3	3.0715
p	6	87	1	0.01	0	0.3	0.0000
p	98	52	1	0.01	0	0.3	45.6736
p	71	76	1	0.01	0	0.3	6.4220
c	68	53	1	0.01	0	0.3	2.0162
p	74	2	1	0.01	0	0.3	71.2836
c	74	26	1	0.01	0	0.3	0.0008
c	63	54	1	0.01	0	0.3	3.3339
c	42	85	1	0.01	0	0.3	42.6277
p	4	62	1	0.01	0	0.3	0.0000
c	90	88	1	0.01	0	0.3	9.5456
c	24	60	1	0.01	0	0.3	35.6453
c	62	82	1	0.01	0	0.3	21.7923
c	2	56	1	0.01	0	0.3	53.4627

type	strike	underlying	Time	r	b	sigma	value
p	92	40	1	0.01	0	0.3	51.4973
p	19	10	1	0.01	0	0.3	8.9340
p	40	19	1	0.01	0	0.3	20.8083
c	59	22	1	0.01	0	0.3	0.0014
p	84	26	1	0.01	0	0.3	57.4230
c	92	66	1	0.01	0	0.3	1.5544
p	62	10	1	0.01	0	0.3	51.4826
p	5	67	1	0.01	0	0.3	0.0000
c	71	92	1	0.01	0	0.3	23.3491
p	99	54	1	0.01	0	0.3	44.7252
c	17	65	1	0.01	0	0.3	47.5224
c	15	51	1	0.01	0	0.3	35.6418
p	48	45	1	0.01	0	0.3	7.0999
p	95	84	1	0.01	0	0.3	16.8794
c	37	57	1	0.01	0	0.3	20.2546
p	8	85	1	0.01	0	0.3	0.0000
c	36	36	1	0.01	0	0.3	4.2498
c	95	86	1	0.01	0	0.3	6.8059
p	96	33	1	0.01	0	0.3	62.3739
c	87	9	1	0.01	0	0.3	0.0000
c	35	65	1	0.01	0	0.3	29.8019
p	74	52	1	0.01	0	0.3	22.8584
c	56	37	1	0.01	0	0.3	0.5123
c	33	57	1	0.01	0	0.3	23.9337
p	20	15	1	0.01	0	0.3	5.4102
c	30	2	1	0.01	0	0.3	0.0000
p	86	58	1	0.01	0	0.3	28.6431
c	73	91	1	0.01	0	0.3	21.0602

Total portfolio value is

```
cat(paste0(summarise(df2,totalValue=(sum(value)))))
```

```
## 1967.8683
```