Homework 6

[redacted]

```
setwd("/Users/[redacted]Bayesian Data Analysis/HW")
source("/Users/[redacted]Bayesian Data Analysis/DBDA2Eprograms/BernGrid.R")
source("/Users/[redacted]Bayesian Data Analysis/DBDA2Eprograms/DBDA2E-utilities.R")
```

```
##
## ************************************************************************
## Kruschke, J. K. (2015). Doing Bayesian Data Analysis, Second Edition:
## A Tutorial with R, JAGS, and Stan. Academic Press / Elsevier.
## ************************************************************************
```

```
## Loading required package: coda
```

```
## Linked to JAGS 4.3.0
```

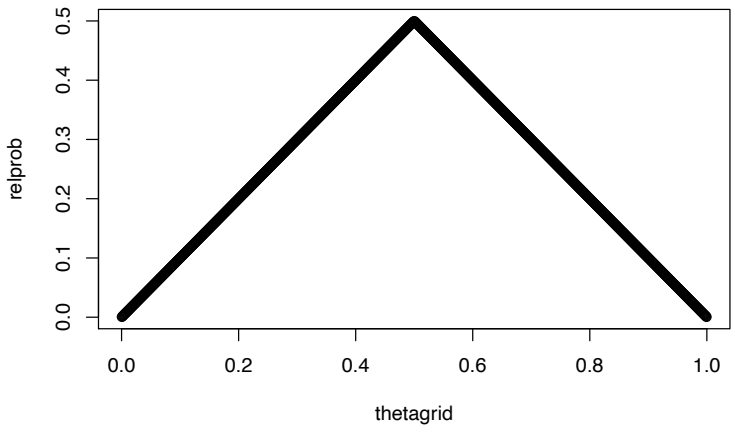
```
## Loaded modules: basemod,bugs
```

```
[redacted]/Bayesian Data Analysis/DBDA2Eprograms/BernBeta.R")
source("/Users/[redacted]/Bayesian Data Analysis/DBDA2Eprograms/HDIofICDF.R")
```

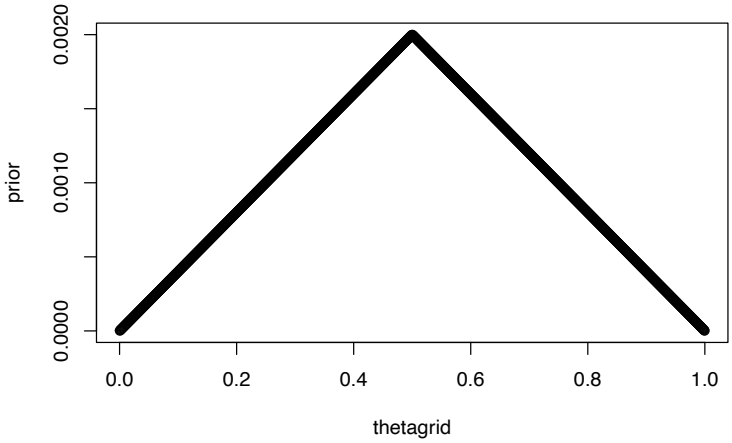
Class Example

The posterior distribution is more concentrated and narrow because the data distribution is more concentrated and we have more data which has more influence on posterior than prior

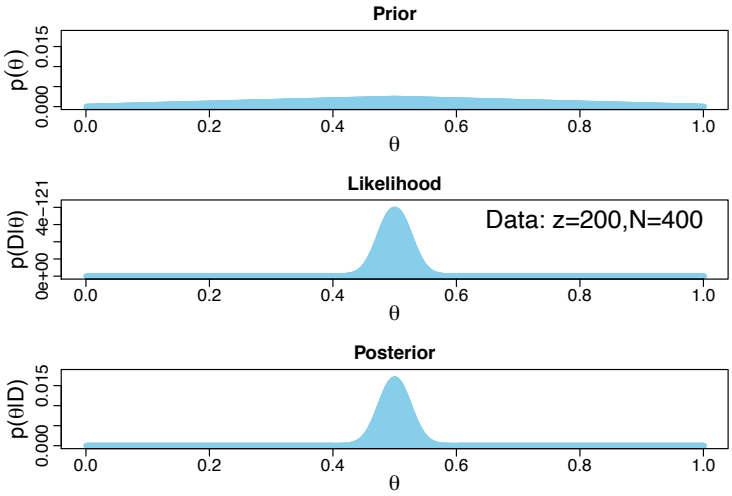
```
binwidth = 1/1000
thetagrid = seq(from = binwidth/2, to=1-binwidth/2, by= binwidth)
relprob = pmin(thetagrid, 1-thetagrid)
prior = relprob/sum(relprob)
plot(thetagrid, relprob)
```




```
plot(thetagrid, prior)
```




```
datavec = c(rep(1,200), rep(0,400-200)) #400 flips, 200 heads
posterior = BernGrid(Theta = thetagrid, pTheta = prior, Data = datavec)
```

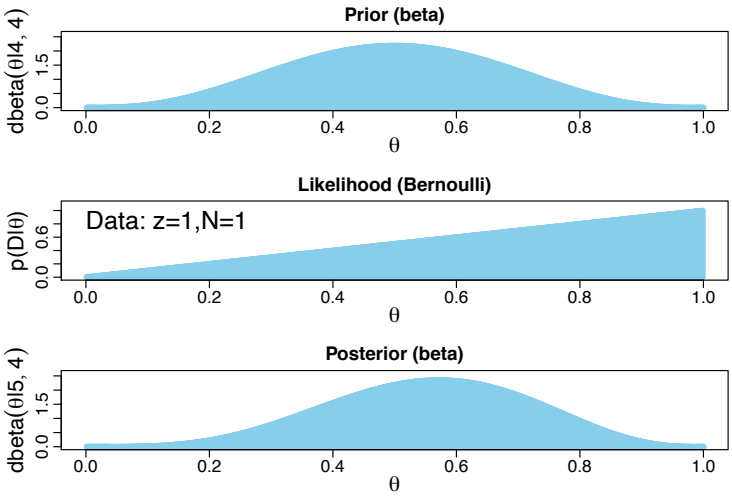


Exercises 6.1

Part (A)

The posterior is dbeta(theta|5,4) and is skewed towards head

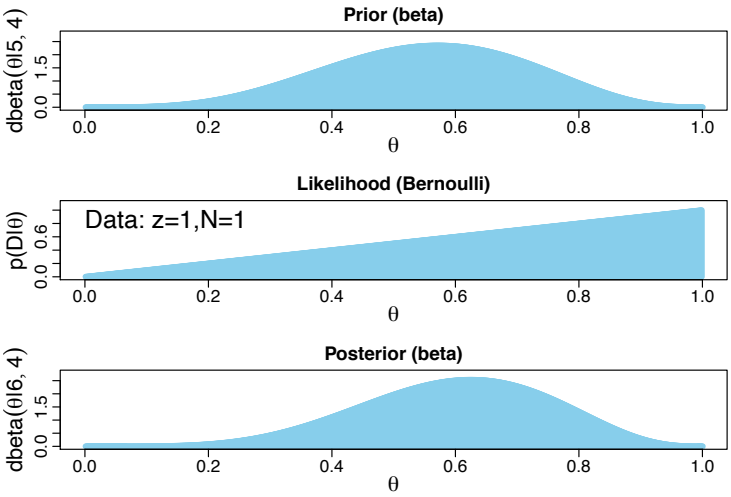
```
posteriorA = BernBeta(c(4,4), c(1))
```



Part (B)

The new posterior is dbeta(theta|6,4) and is skewed towards head

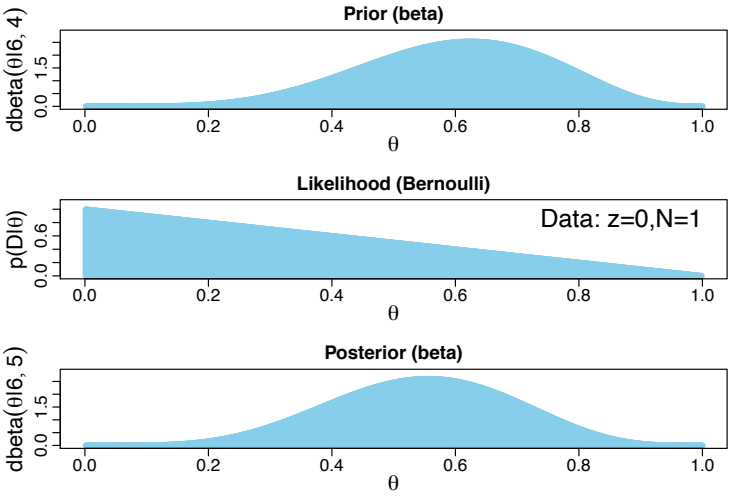
```
priorB = posteriorA
posteriorB = BernBeta(priorB, c(1))
```



Part (C)

The new posterior is dbeta(theta|6,5)

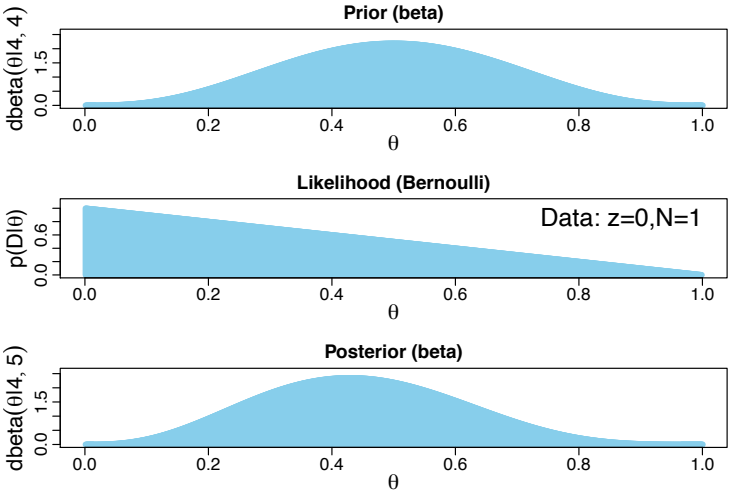
```
priorC = posteriorB
posteriorC = BernBeta(priorC, c(0))
```



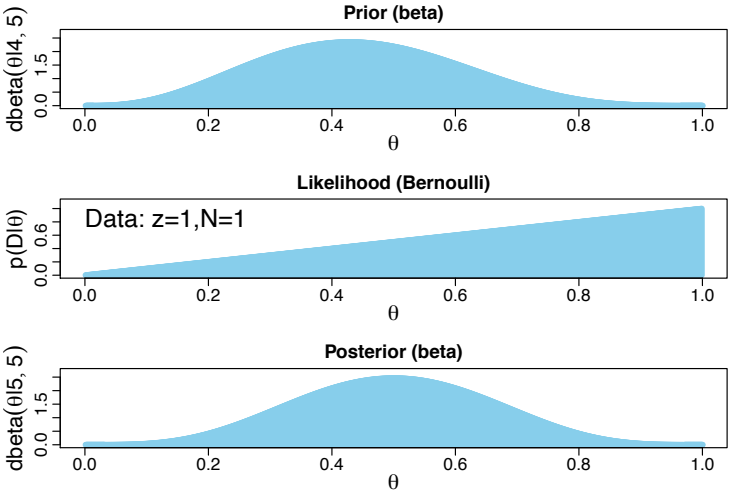
Part (D)

The new posterior is dbeta(theta|6,5) and is the same as before. The order doesn't matter.

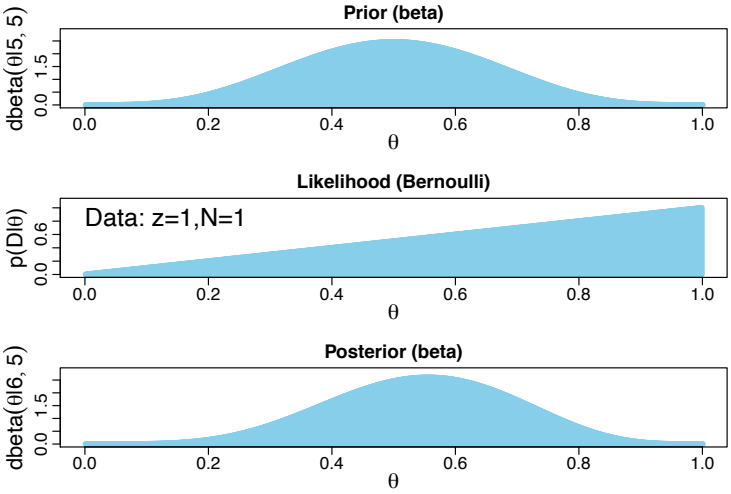
```
# the same updates but in the order T, H, H
posteriorA.2 = BernBeta(c(4,4), c(0))
```




```
priorB.2 = posteriorA.2
posteriorB.2 = BernBeta(priorB.2, c(1))
```




```
priorC.2 = posteriorB.2
posteriorC.2 = BernBeta(priorC.2, c(1))
```

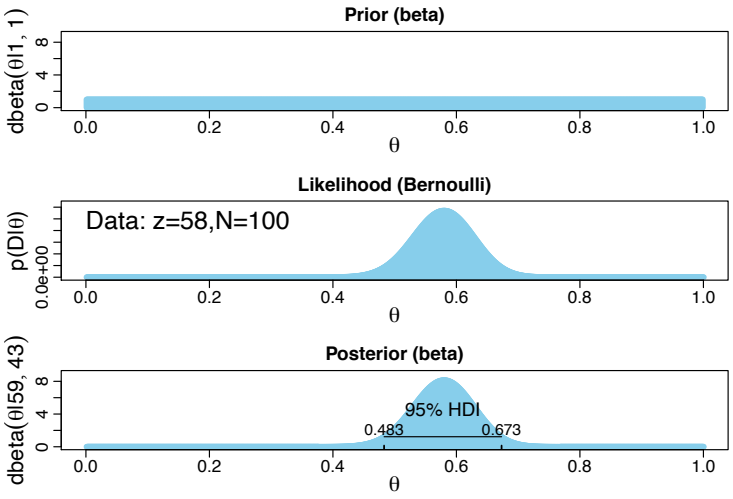


Exercises 6.2

Part (A)

The 95% HDI is .483 to .673.

```
prior.Ex2 = c(1,1)
data.Ex2 = c(rep(1,58),rep(0,100-58))
posterior.Ex2 = BernBeta(prior.Ex2, data.Ex2, showHDI = TRUE)
```



Part (B)

The 95% HDI is .506 to .642 and is narrower than before.

```
prior.Ex2.2 = posterior.Ex2
data.Ex2.2 = c(rep(1,57),rep(0,100-57))
posterior.Ex2.2 = BernBeta(prior.Ex2.2, data.Ex2.2, showHDI = TRUE)
```