

Assignment 1 - Bayesian data analysis

anonymous

1 General information

2 Basic probability theory notation and terms

Write your answers here!

3 Basic computer skills

Do some setup here. Explain shortly what you do.

```
# Do some setup:
distribution_mean = .2
distribution_variance = .01

# You have to compute the parameters below from the given mean and variance
# distribution_alpha = ...
# distribution_beta = ...
```

3.1 (a)

Plot the PDF here. Explain shortly what you do.

```
# Useful functions: seq(), plot() and dbeta()
```

3.2 (b)

Draw samples and plot the histogram here. Explain shortly what you do.

```
# Useful functions: rbeta() and hist()
```

3.3 (c)

Compute the sample mean and variance here. Explain shortly what you do.

```
# Useful functions: mean() and var()
```

3.4 (d)

Compute the central interval here. Explain shortly what you do.

```
# Useful functions: quantile()
```

4 Bayes' theorem 1

Compute the quantities needed to justify your recommendation here. Explain shortly what you do.

```
# You can do the computation with pen and paper or in R.  
# Either way, you have to explain why you compute what you compute.
```

5 Bayes' theorem 2

You will need to change the numbers to the numbers in the exercise.

```
boxes_test <- matrix(c(2,2,1,5,5,1), ncol = 2,  
  dimnames = list(c("A", "B", "C"), c("red", "white")))
```

5.1 (a)

Keep the below name and format for the function to work with `markmyassignment`:

```
p_red <- function(boxes) {  
  # Do computation here, and return as below.  
  # This is the correct return value for the test data provided above.  
  0.3928571  
}
```

5.2 (b)

Keep the below name and format for the function to work with `markmyassignment`:

```
p_box <- function(boxes) {  
  # Do computation here, and return as below.  
  # This is the correct return value for the test data provided above.  
  c(0.29090909,0.07272727,0.63636364)  
}
```

6 Bayes' theorem 3

You will need to change the numbers to the numbers in the exercise.

```
fraternal_prob = 1/125  
identical_prob = 1/300
```

Keep the below name and format for the function to work with `markmyassignment`:

```
p_identical_twin <- function(fraternal_prob, identical_prob) {  
  # Do computation here, and return as below.  
  # This is the correct return value for the test data provided above.  
  0.4545455  
}
```