# Answer sheet Probabilistic lab (lab 3)

Instructions: Fill out your answers below. Make a PDF of the complete file, and upload that **PDF** on Blackboard.

Student 1 (Full name & student number): Vito Vekic (1091719)

Student 2 (Full name & student number): Sterre van Strien (6138942)

## **Blackboard question 1**

*1A: Calculate the posterior value that people can see in the future under the data. Assume:*

* *The prior probability that people can see in the future is equal to not seeing in the future: 50% (H)*
* *The probability to observe this data under the hypothesis that people can see in the future is 0.531 (D | H)*
* *The probability to observe this data under the hypothesis that people cannot see in the future is 0.52 (this captures the intuition that values around 0.5 are likely when fully guessing) (D | !H)*

**The posterior value = 0.51**

*1B: What is the Bayes factor? (BFpeople can see in the future, not see in the future)*

**BayesFactor = 1.13.**

*1C: Eric-Jan, a more skeptic researcher, thinks the prior probability that people can look into the future is 0.001. What are the posterior odds for such a skeptic researcher?*

**0.001**

*1D: (you need to calculate 3 values here)*

*The experiment is replicated three times by different researchers, independently. So, the conditional probabilities are estimated independently. The priors are updated based on the outcomes of earlier experiments, starting with the outcome of the initial experiment. The relevant other data is in the table below. For each experiment give the new posteriors of P(Hpeople see in the future | Data).*

i: So we assume H = 0.51. Then posterior value = 0.49.

ii: So we assume H = 0.49. Then posterior value = 0.42

iii: So we assume H = 0.42. Then posterior value = 0.34

1E.

We know that the BayesFactor is >30%, which suggests the data is very strong evidence for our hypothesis, People can see in the in the future. (See: assignment page 5)

**Blackboard question 2**  
Make sure to round all answers to 5 decimals

2A:

2B:

2C:

## **Blackboard question 3**

3A:

i. For the RF Model:

ii. For the BS Model:

3B:

## **Blackboard question 4:**

4A:

4B: Copy screenshot / picture here

4C:

4D:

### Bonus question:

If you complete a bonus question (optional), please answer the questions of the assignment below.

Bonus subquestion 1:

|  |  |  |  |
| --- | --- | --- | --- |
| Model class | Free parameters | Total nr parameters | BIC |
| RF | a,b,c x 2 | 6 |  |
| RF | a,b,c,d x 2 | 8 |  |
| BS | a,b,c x 2 + 1 BS | 7 |  |
| BS | a,b,c x 2 + beta + N | 8 |  |
| BS | a,b,c,d x 2 + 1 BS | 9 |  |
| BS | a,b,c,d x 2 + beta + N | 10 |  |

Bonus subquestion 2: