**Assignment 3: Learning and Memory PSY 306 (Winter 2023)**

**Name:**

**Roll Number:**

**Instructions:** Please write your own responses and do not copy or lift text/code from any source. If you are referring to credible external sources other than the attached paper for your answers, please cite those sources (within the body of text and the provide a reference list at the end) in the APA citation format (<https://www.mendeley.com/guides/apa-citation-guide>). Word limits given are indicative and less than the indicated numbers may also be used.

**Please download this MS word question-cum-response template to TYPE your answers and feel free to add sheets as required. Convert this document to a PDF and rename the file:. before submitting. Please note that answers in this template only will be evaluated and hand-written or scanned answer sheets will not be evaluated. Please submit ONLY ONE PDF and no extra files as it increases the time to evaluate them. DO NOT change the basic structure of the template. DO NOT remove the marks assigned for each question.**

**[Strict deadline for submission: 23rd April, 11:00 PM]**

**Q2) Please watch the attached video by Prof. Neil Burgess (Institute of Cognitive Neuroscience, University College London) and answer the following questions based on your understanding of the video.**

**[All figures/schematics should be properly labelled and should have accompanying captions/legends to provide all information necessary to interpret the same…]**

1. **You are in the library and just found a place in the reading room. You settle down to study when**

**you get a call and must step outside the library to take the call. After finishing the call as you are going back to the reading room your brain helps you navigate to the location in the library that you chose for yourself. Draw a flowchart of the neural algorithm/mechanism that will enable your brain to guide your path in moving to the spatial location that you had found inside the library reading room.**

**Hint: Use proper flowchart shapes and conventions**

**[https://support.microsoft.com/en-us/office/create-a-basic-flowchart-in-visio-e207d975-4a51-4bfa-a356-eeec314bd276]**

**Briefly explain the key steps of the above neural mechanism.**

**[8 + 2 points]**

[Answer]

1. **Use the data given in Assignment3-Q2Bdata.xlsx | An experimenter recorded and pre-processed EEG data from 20 participants on an auditory oddball task playing them standard and deviant tones. The interstimulus intervals between the two tones were manipulated at four levels – 0.75 s, 1.5s, 3s, 8s, 9s as the EEG traces evoked by both standard and deviant tones were measured (1000 Hz sampling rate) from the participants’ brains. Each sheet of the Excel file has data for both standard tone (beginning from cell ‘B3’) and deviant tone (beginning from cell ‘B25’). For each of the above tone there is a 20 (participants) x 100 (time point) matrix in each sheet. Do the following…**

**[All figures/schematics should be properly labelled and should have accompanying captions/legends to provide all information necessary to interpret the same…]**

**B-i) Make a figure with five subplots – one for each interstimulus interval. In each subplot, graph the average EEG response (across 20 participants) from both standard and deviant tones in blue and red colours respectively. [4 points]**

[Answer]

**B-ii) Analyze the data from each interstimulus interval statistically and report the time scale of echoic memory. Explain the cognitive science consistent rationale behind the calculation and reported time scale. [4 + 2 points]**

**Hint: Carefully inspect the correctly created figure above for clues.**

[Answer]