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Modeling in Cognitive Science (WiSe 2023/24): Group Project

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In the group project, you will perform a computational modeling study based on a problem of your choice.

This group project is split into two components: a practical and a communication component.

Practical component (20 points)

In the practical part of the group project, you get to implement the computational modeling workflow in a Python Notebook.

Please implement the practical component of your group project in the following template for a Python Notebook:

https://colab.research.google.com/drive/1BfXifCdrEzQ4hGGrTIJhbk$_F kZLr_w y4?usp = sharing$

How to open and work on the practical part of the group project

1. Click on the link we provide to the Jupyter notebook file. This should take you directly to the notebook on Colabroatory.
2. From the notebook page on Colabroatory, select `File > Save a Copy in Drive`.
3. Work from your copied notebook to complete the practical component of the group project.

Communication component (20 points)

This component requires you to communicate your modeling study, either in the form of a **research article** or a **video presentation**. Both should address the questions in the order listed in the following **template**: https://www.overleaf.com/read/jqsqknthsnkcc36800

Option 1: Research article

You may opt to communicate your computational modeling study in the form of a research article. This can be beneficial if you want to publish your article in the Cognitive Science Student Journal or elsewhere.

Here, we will follow the format for research articles of the Cognitive Science Society Conference. However, instead of writing a full-fleshed research article, you are required to provide answers to a number of questions. In this way, you don't have to worry about style and can focus on the content of your research study. That said, it should not require much work to turn your group project into a complete research article after the course. You may use the following LaTeX template for your research article:
https://www.overleaf.com/read/jqsqknthsnkcc36800

If you don't want to use this template or don't want to work in LaTeX, you can find the formatting instructions under
`studip > Files > Group Project > Formatting_Instructions.pdf`. In this case, make sure to adhere to the question structure of the template.

The research article **cannot exceed 7 pages (excluding references)**. That is, you can write 7 pages plus any number of additional pages for references. In the "real world" exceeding the page limit would result in a desk rejection of the article. In this course, a penalty of 3 points will be deducted for every additional page above the page limit.

Option 2: Video

You may also opt to do a video presentation of your work. As with the research article, you are required to answer the questions in the order they are provided in the template:
https://www.overleaf.com/read/jqsqknthsnkcc36800

Your video may **not exceed 15 minutes**. A penalty of 1 point will be deducted for every minute above the limit. In addition, your video size may not exceed 100 MB.

Modeling problems

There are three broad modeling problems which you can choose from.

1. Experiment 1: Two-step task (amenable to reinforcement learning models).
2. Experiment 2: Task switching with moving dots (amenable to reinforcement learning, neural network models, dynamical system models, sequential sampling models, Bayesian models).

3. A dataset of your choice.

For Options (1) and (2), you will have to collect your own behavioral data. We will post further instructions (detailing the experiment and potential modeling approaches) for these two options under `studip > Participants > Groups`.

Note: *For your modeling study, you are not expected to capture every aspect of the data. Choose a basic phenomenon you are interested in and focus on that. Your work won't be evaluated based on how well your models fit the data but based on how you think about computational modeling and implement the computational modeling workflow..*

How to submit your group project

Please submit your Jupyter notebook file and your research article (pdf) or video (any common video format) into the following Google Drive:
https://drive.google.com/drive/folders/1I5ryHoofGRij8hLBuQqiZoIp3QJMfh-P?usp=sharing

First, make sure to create a folder for your group titled "Group X" where X refers to the number of your group in studip (under `studip > Files > Group Project`).

Grading

You can achieve a total of 40 points in the final group project. The group project will make up 40 % of your total score for the class.

Individual Contributions

Make sure to remark the individual contributions to the group project in a short "Acknowledgement" section of your communication part (see the template for an example).

Bonus points

You can earn up to three bonus points in the group project (2 points in the practical component, 1 point in the communication component). These add up to your total points in the group project (which is capped at 40 points).

Troubleshooting

- Please make sure to review the guide on using Google Colaboratory under `studip > Files > Resources > Google_Colaboratory.pdf`.
- Message one of the teaching assistants or post on the course forum on studip if you run into any problems.