Final task-Open Ended Question

Description

For a project you've worked on (e.g., a research project or class project), please share or describe the organization of data/materials and associated documentation for the project. You can pretend like you are passing the project off to us, so you should give us everything you have to help us make sense of the project materials to date. You can include any info, descriptions, links, or files you think would be helpful. Note, actually sharing data files is not necessary.

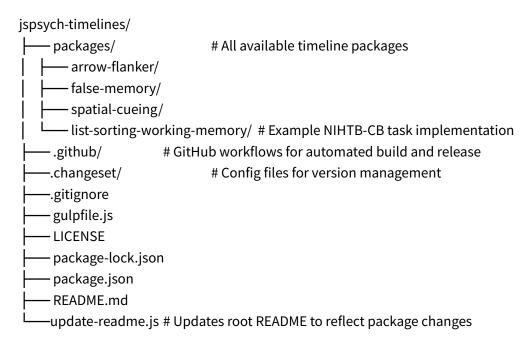
Response (link to Google Docs)

Task Overview

As Research Software Engineer at <u>isPsych</u>, I am adapting the tasks in the <u>NIH Toolbox Cognition</u> <u>Battery</u> (NIHTB-CB) into jsPsych experiment packages. Each of all 12 tasks in the battery is to be implemented as a separate package under the <u>packages</u> folder in the <u>jspsych-timelines</u> repository, which is jsPsych's community repository for sharing experiments as "timelines" that can then be easily imported, modified and run online interoperably by other researchers.

Repository Structure

Here is a walkthrough of the structure of jspsych-timelines, the most relevant files commented:



Implementing a New NIHTB-CB Task

You should mostly be focusing on adding your implementations of the NIHTB-CB tasks as folders under the packages folder, where all the actual experiment timeline packages are. Here is a high-level walkthrough of how you would start implementing a task in NIHTB-CB as a jsPsych timeline package in jspsych-timelines:

Step One: Set Up Local Development Environment

Clone jspsych-timelines

```
Unset
git clone https://github.com/jspsych/jspsych-timelines.git
cd jspsych-timelines
```

2. Create a new branch and pull request for your new timeline package (e.g., 'nihtb-cb_oral-symbol-digit-test') and check the branch out locally. As an example, I have created a separate <u>branch</u> and a <u>pull request</u> for the implementation of the <u>List Sorting Working Memory Task</u> in NIHTB-CB

```
Unset
git checkout -b nihtb-cb_<task-name>
```

Install dependencies from your root directory (jspych-timelines)

```
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npm install
```

Step Two: Generate a New Timeline Package

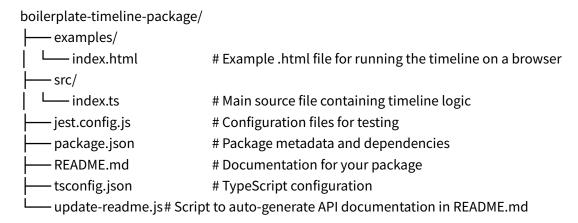
1. Use our <u>built-in tool</u> for creating new timeline packages in a standardized format:

```
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npx @jspsych/new-timeline
```

2. Answer the prompts generated by the tool in the command line to create a new timeline template in the packages directory. These prompts will ask for information like the package's author's name, a brief description of the package, a link to the author's GitHub, etc.

Step Three: Understanding the Generated Boilerplate Package

After these steps, a boilerplate package for your new timeline package should be created under the packages folder based on the <u>timeline template</u> specified in @jspsych/new-timeline. This boilerplate package has the following structure:



Now, you should edit the files in the new boilerplate-timeline-package to implement your timeline. src/index.ts is the main file that will be loaded when the timeline is run, and where you will be writing your main body of code that implements your task as a jsPsych timeline.

Step Four: Implement Your Timeline

The most important thing to know about developing a timeline package for <code>jspsych-timelines</code> is that you are highly encouraged to use our <code>new-timeline</code> command line tool and follow the standardized source script export structure it imposes. You can find more detailed information about how to use this tool, the standardized format it enforces on the created timeline package source scripts, and the reasoning behind it in the

<u>jspsych-dev/packages/new-timeline/README.md</u> file. We also have a <u>working document</u> describing this standardization and how it encourages open, collaborative development in the scientific community.

In brief, your src/index.ts file should export three things:

- 1. The main createTimeline() function that serves as your default export and runs the entire experiment timeline
- 2. The timelineUnits array that exports meaningful partitions of your experiment timeline that you think would be useful and reusable for others, e.g. demos, test blocks, procedures, individual trials, etc.
- 3. The utils array that holds any useful functions for the smooth running of your experiment

The trickiest challenge in this process is determining how to demarcate your code in a way that produces useful, meaningful partitions that you can then export for others to use. A good strategy is to think about your conceptual understanding of your experiment _ what are the different logical components that build up to it?

See footnote¹ if you need help getting started with writing a jsPsych experiment

Step Five: Testing Your Timeline

When you are done editing src/index.ts, it is time to make sure your experiment actually runs!

Here are the steps:

1. Navigate to your package directory to build the timeline. This will create a dist directory with the compiled timeline.

cd pacakges/<task-name>
npm run build

- 2. Verify that the timeline works by opening examples/index.html in your browser. examples/index.html is a basic jsPsych experiment template that you can modify to illustrate how your timeline works.
- 3. Fix any issues in your code.

For an example timeline closer to your implementation of NIHTB-CB tasks, you should check out my recent, complete implementation of the <u>Hearts and Flowers Task</u>, a classic experiment paradigm we implemented in preparation of a meeting with <u>Levante</u>, a friendly lab focused on developing assessment suites for investigating how variability in development affects learning outcomes.

¹You can follow a thorough <u>tutorial</u> demoing the creation of an experiment timeline on the jsPsych webpage, or read through the other packages in jspsych-timelines.

Step Six: Document Your Timeline Package

When your timeline runs successfully, it is time to publish it to be publicly accessible by officially adding it to jspsych-timelines! The repository has tools that automate this process:

1. Auto-generate documentation for your timeline's README . md and modify to make sure there are clear descriptions of the task, usage instructions, and fleshed out documentation on the parameters and customization options for each function

```
Unset node run update-readme
```

Step Seven: Publish Your Package for Others to Use

Add a changeset in the main directory of the package repository. This will prompt you for a
description of the changes you made and create a new changeset file in the changesets
directory.

```
Unset
npm run changeset
```

2. Our team, which you are part of now, will review your code and if all is well, merge your pull request into the main branch of jspsych-timelines. The <u>release.yml</u> file under <u>./qithub/workflows</u> in jspsych-timelines will detect the changeset in your pull request and automatically release your timeline package to the npm registry, a popular registry for sharing JavaScript packages. Your timeline package can now be easily found under the @jspsych namespace on npm!

Open Science Statement

By following this structure of writing jsPsych experiments, your implementation will help open science practices in cognitives science research by making classic experiment paradigms more readily adopted and run by researchers worldwide. Our standardized format for timeline packages promotes:

- Code reuse and interoperability
- Transparent scientific methods
- Collaboration within the research community
- Reproducibility of experiments