Module 0: What calls you?

Name:

1 Intro

The purpose of this worksheet is to help spark your imagination and curiousity about the fields of neuroscience, machine learning, general intelligence and creating really cool shit. To get started, I will provide an absolutely **non-exhaustive list of possible topics, and a few tasks for you to complete.**

1.1 Example Topics

CS-Focused

- **Multi-agent reinforcement learning Communication and language between agents, socialization**
- **Machine learning on Intel (or other) neuromorphic chips (Loihi)**
- **Hebbian learning and spiking neural networks**
- **Neural cellular automata**
- **Measuring integrated information across neural networks**

Neuro-Focused

- **Numenta spiking dendritic networks**
- **Field overview of brain-based intelligent systems**
- **Explore cortical columns and the "Thousand Brains" theory**
- **Explaining how brain structure is related to function in different areas Relate this to ML, how can we digitalize these systems?**
- **Biologically inspired forms of memory in AI and reinforcement learning**

Here are some ways that neuroscience can be used to create generally intelligent machine learning:

- **Inspiration from the brain: The structure and function of the human brain can inspire the design of machine learning algorithms. For example, deep learning neural networks are inspired by the structure of the brain's neural networks.**

- **Neural network optimization: Machine learning algorithms can be optimized using neural network models that simulate the brain's neural activity. This approach can improve the accuracy and efficiency of machine learning algorithms.**
- **Brain-computer interfaces: Researchers can develop brain-computer interfaces that allow machines to communicate with the brain directly. This technology can enable machines to learn from the brain's neural activity, leading to more intelligent and responsive machine learning algorithms.**
- **Cognitive modeling: Machine learning algorithms can be designed to model cognitive processes, such as attention, memory, and decision-making. This approach can help researchers understand how the brain processes information and develop more intelligent algorithms.**

2 Short Answer

a) **List at least five topics or ideas you have based off of or not listed above. If you are having trouble coming up with some, go to**

> **TODO: Your answer here**

b) **Create a semi-ranked list of your top 10 interests. Jot some questions you have about a field, the world, or specific research areas.**

> **TODO: Your answer here**

c) **Brainstorm some marvelous schemes for integrating some of the interests you have, generating answers to questions you had, or finding solutions to open problems. Draw, write, spew, etc... When you are done, do some googling about your best ideas to see if anyone has researched or tried them already.**

> **TODO: Your answer here**