**Section 1. Complex Systems**

I have been curious about complex systems ever since I first came across it in my thermodynamics class in high school but the thing that really got me interested and understand its true vast potential was after I finished the “Introduction to complexity” online course from Santa Fe institute’s Complexity explorer. It has long been my wish since to study at this place.

Complex systems are universal found everywhere in the world around us, from biology and ecology to economics and social systems. What really appeals to me is that it is the only course that can give me freedom of study and combine all my interests together from languages to electronics. Understanding these complex systems can help us better understand how the world works and make more informed decisions about how to address challenges and opportunities. This allows for a rich and diverse perspective on the systems being studied and the ability to address problems from multiple angles.

I’ve since decided to become a computer scientist because I love process of computation and the quest for answers. Yet I’ve always known I want to study the laws of nature that govern universe and literature and people, not just the coding. That’s why I want to do research at SFI, because the scientists there want to find the overarching patterns in all the disciplines that fascinate me.

**Section 2. Topics**

Agent-based modeling is a powerful method that can be used to simulate the actions and interactions of individual agents, such as consumers, businesses, and other organizations, in a complex system. As a computer science major with an interest in macroeconomics, I am particularly interested in studying the application of chaos theory and agent-based modeling in macroeconomic systems.

The study of chaos theory and agent-based modeling in macroeconomic systems is important for several reasons. By understanding how small changes in the behavior of individual agents can lead to complex and chaotic macroeconomic outcomes, we can improve our ability to predict and prevent economic phenomena such as market crashes, financial crises, and business cycles.

To conduct this study, I would take a comprehensive approach that includes defining the research question and parameters, conducting a thorough literature review, collecting extensive data, and analyzing and interpreting the results. An important aspect of this study would be validating the model through a comparison of simulated and real-world data. This would help to ensure the robustness and generalizability of the results.

Furthermore, I would consider ways to improve the model and make it more realistic, such as by incorporating more variables, increasing the number of agents, or adding more sophisticated decision rules for agents. I am excited about the opportunity to tackle this problem through interdisciplinary collaboration and effort.

**Section 3. Collaborative Work**

One experience with collaboration that I had in a computer science class was when my group and I were tasked with creating a web application for the “web technologies” course project. We had to work together to come up with ideas, divide the work evenly, and communicate effectively throughout the process.

From the start, we made sure to clearly define roles and responsibilities for each member of the team and set clear goals for what we wanted to accomplish. We also made an effort to regularly check in with each other and provide updates on our progress.

One of the challenges we faced was that we all had different schedules and commitments, so coordinating meetings and working on the project remotely was sometimes difficult. To overcome this, we made sure to communicate clearly about our availability and used online tools like Google Docs and Slack to stay in touch and keep track of our progress.

In the end, our team was able to successfully complete the project and present a cohesive marketing campaign to the class. Through this experience, I learned the importance of effective communication and organization in teamwork. I also learned the value of flexibility and being open to adjusting our plan as needed in order to meet deadlines and achieve our goals, as well as be open to constructive criticism. Overall, I enjoyed the challenge of working as part of a team and gained valuable skills in collaboration that I will be able to apply in future projects.

Furthermore, these lessons helped me create strong well-balanced teams and work on over 7+ hackathons last year.