Report on project : eSim-Cloud

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This report presents the implementation details and challenges faced during the internship period on the project. I was assigned various tasks in the EDA front-end of the eSim-Cloud project. The very first task was addressing the issue where the proper netlist wasn't generated for the circuit upon uploading a JSON file, necessitating my attention. After resolving this issue, subsequent tasks included ensuring that when adding a new wire to ground and a component in the circuit, the label should display '0', indicating its connection to the ground. Later, I was tasked with implementing undo and redo functionalities for circuit components, accommodating various actions. Additionally, I was part of the team responsible for building the sub-circuit, a new feature integrated into the existing system. During this phase, I explored various backend processes and implementations, including netlist generation for the newly added sub-circuit.

Netlist Generation for external files (.json):

One of the system's issues was the failure to generate a netlist for circuits uploaded via external JSON files. To address this, I initially delved into the system's files and folders to gain a comprehensive understanding of the implementation. This process required a considerable amount of time to grasp the existing code base thoroughly. However, this familiarity with the system proved beneficial for subsequent tasks. Upon closer examination, I identified the problem residing within the EDA frontend and proceeded to rectify the issue within the relevant JavaScript file. The testing was done using the .json provided to me and by generating a new one as well.

Adding a new wire to ground and other components (Labeling):

An issue arose when utilizing pre-existing circuits from the gallery or incorporating other circuits, particularly regarding the automatic labeling when connecting components to the ground or to each other. Despite intending to provide default labeling during connections, the system failed to do so in this scenario. Upon identifying the missing logic within the existing code base, I delved into addressing the issue. Subsequently, I implemented the necessary logic and rectified the problem to ensure proper labeling when connecting components to the ground or other components.

Undo and Redo Functionality for Circuit Components Across Various Actions:

The existing undo and redo feature within the system operated by completely reverting or restoring the entire set of actions, saving only the initial and final versions for undo and redo respectively. However, there was a logical inconsistency where even when opening an existing file requiring adjustments, undo and redo actions were disabled. Recognizing this logical flaw and other concerns, I embarked on resolving it.

I devised a solution to address this issue. Now, when opening a file for the first time, undo and redo actions are appropriately disabled, aligning with logical expectations. However, I encountered a persistent issue regarding stack size when a large number of changes were made or when undo and redo actions were repeated numerous times. This challenge posed difficulties during the implementation phase of this task.

Sub-Circuit Generation:

Subsequently, I collaborated with the team to develop the sub-circuit generation feature. During this phase, my responsibilities included exploring the actual netlist generation process and understanding the various properties associated with each component. Additionally, I contributed to setting specific model parameters in the Django backend to facilitate the seamless integration of this new feature into the existing system. This involved a thorough examination of the backend functionalities and ensuring that the necessary adjustments were made to accommodate the generation of sub-circuits effectively.

Throughout this internship, I gained valuable experience working on an open-source project, mastering git for version control, and becoming proficient in various tech stacks including ReactJS, Django, and Docker. Additionally, I acquired knowledge of several other essential concepts relevant to the project. This experience has had a significant impact on my resume, showcasing my ability to adapt to different technologies and contribute effectively to projects in a collaborative environment.