Lisp in Summer Projects Submission

Submission Date	2013-11-01 18:22:49
Full Name	Fengnian Tian
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Project Name	E-Toothbrush without MATLAB
Type of software	other
General category	utility
LISP dialect	Commmon Lisp
GitHub URL	https://github.com/miao1595160/Projects2
Did you start this project?	Yes, all the code is written by me
Project Description	I want to describe my project in this form.
Purpose	This project is designed to support modularity. It shows how Knowledge Based Engineering (KBE) can accelerate the development of an electronic toothbrush by automation the reparative processes.
Function	Support top down design. Automatic assembly. Automatic design with constraints.
Motivation	We want to test how nowledge Based Engineering (KBE) can support the modularity. We also want to create an integrated design environment which includes design, analysis and requirements.
Audience	People related to CAD/CAE development, designer, web-based product developer. Product user.
Methodology	The component is built with High Level Primitives (HLPs). Once enough initial values are given to the HLPs, the geometry can be automatically generated. Moreover, the assembly processes are also pre-defined. For example, we can select different motor from motor library and get an

	assembly without specify the position, direction or constraint with other component like gears. This feature let us can generate a new design of toothbrush rapidly. Finally, when we finish a design, we can test it in MATLAB. Though the communication model (a matlab package), we can output data and commands to the MATLAB and then read simulation results back. The whole processes (design and simulation) are checked with various constraints such as ergonomics, mechanical interferences check, user requirements etc. The design and test are integrated together.
Conclusion	The program works well. All functions are realized. You can build an electronic toothbrush easily and quickly with this program. The design process starts from specification of user requirements and down to the final design, which means it linked the user and final product in one environment. Constraints and simulation are also integrated, making sure the design always on the right path.
Build Instructions	01 Setup http://youtu.be/dhV0spOXAWw without MATLAB setting part
Execution Instructions	02 Model Generation http://youtu.be/G_A-dNaSNog 03 Automatic Design http://youtu.be/TylO6LlBNAc without motor selection by AHP and final simulation in MATLAB
Official	I have read rules and have abided by them. I am 18 years of age or older. I am not living in Brazil, Quebec, Saudi Arabia, Cuba, Iran, Myanmar (Burma), North Korea, Sudan, or Syria.