Software Requirements Specification (SRS) Document

Porting [1]Circular Dichroism Spectroscopy[1] Virtual Lab to JavaScript

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Brief Problem Statement

Virtual Labs, an initiative of MHRD, Government off lndia has more than 1500 web-enabled experiments which are designed for remote operation. ln this project, our focus is on porting the ‘Circular Dichroism Spectroscopy' lab experiment codes from Flash and Java-dependent to JavaScript. The experiments and activities (Exp. 01 to Exp. 10) are created through embedded SWF files and also depend on Jmol Java applet.

System requirements

sDmol.js library developed at the University of Pittsburgh, UGA for molecular visualization and interaction. The website is written in HTML5, CGGs and JavaGcript and hence, the usage of web-browsers supporting them is recommended.

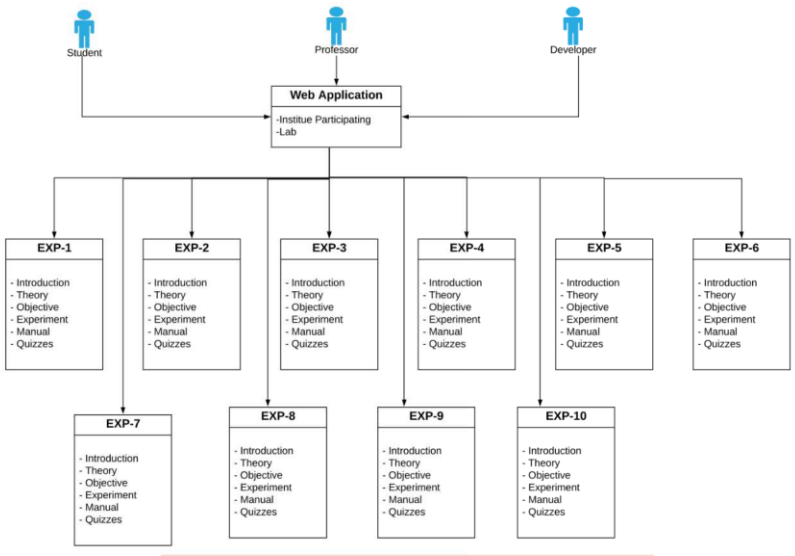
Users profile

The primary target audiences are students and faculty members of science and engineering colleges who do not have access to good lab facilities. Highly motivated high-school students, researchers from various educational institutes, and different educational institutes may use the resources available for learning, teaching and collaborating. A great majority of the audience are assumed to be computer-literates.

Feature Requirements (described using use cases)

S.No.	User Case Name	Description	Release
01.	Experiment 01 Simulation	Porting the experiment from Flash, Jmol, Java applet dependency to JavaScript	R2
02.	Experiment 02 Simulation	Porting the experiment from Flash, Jmol, Java applet dependency to JavaScript	R1
03.	Experiment 03 Simulation	Porting the experiment from Flash, Jmol, Java applet dependency to JavaScript	R1
04.	Experiment 04 Simulation	Porting the experiment from Flash, Jmol, Java applet dependency to JavaScript	R2
05.	Experiment 05 Simulation	Porting the experiment from Flash, Jmol, Java applet dependency to JavaScript	R2
06.	Experiment 06 Simulation	Porting the experiment from Flash, Jmol, Java applet dependency to JavaScript	R2
07.	Experiment 07 Simulation	Porting the experiment from Flash, Jmol, Java applet dependency to JavaScript	R1
08.	Experiment 08 Simulation	Porting the experiment from Flash, Jmol, Java applet dependency to JavaScript	R1
09.	Experiment 09 Simulation	Porting the experiment from Flash, Jmol, Java applet dependency to JavaScript	R1
10.	Experiment 10 Simulation	Porting the experiment from Flash, Jmol, Java applet dependency to JavaScript	R2

Use Case Diagram



Use Case Description

Use Case Number:	UC-01
Use Case Name:	Experiment 01 Simulation
Overview:	Web experiment to determine the specific rotation of a sugar using a polarimeter.
Actors:	Mayank Goyal and Jalees Jahanzaib
Pre condition:	Requires Adobe Flash plugin support
Flow:	Main (success) Flow: 1. Study about the activity by simulating the existing Flash-based experiment. 2. Analyze the existing code for dependencies (esp. Flash, Jmol applet). 3. Code the experiment using the new tools identified.
	Alternate Flows: If the simulation is not-working, learn about the working from the manual provided for the experiment.
Post Condition:	The experiment will be fully JavaScript based.

Use Case Number:	UC-02
Use Case Name:	Experiment 02 Simulation
Overview:	Web-based laboratory experiment to to understand the effect of chiral substances on plane polarized light as a function of wavelength
Actors:	Naren Akash R J and P Meena Raja Sree
Pre condition:	Requires Adobe Flash plugin support
Flow:	Main (success) Flow: 1. Study about the activity by simulating the existing Flash-based experiment. 2. Analyze the existing code for dependencies (esp. Flash, Jmol applet). 3. Code the experiment using the new tools identified.
	Alternate Flows: If the simulation is not-working, learn about the working from the manual provided for the experiment.
Post Condition:	The experiment will be fully JavaScript based.

Use Case Number:	UC-03
Use Case Name:	Experiment 03 Simulation
Overview:	Simulate an experiment to To study the Optical Rotatory Dispersion (ORD) of some chiral substances.
Actors:	Mayank Goyal and P Meena Raja Sree
Pre condition:	Requires Adobe Flash plugin and Jmol Java applet support
Flow:	Main (success) Flow: 1. Study about the activity by simulating the existing Flash-based experiment. 2. Analyze the existing code for dependencies (esp. Flash, Jmol applet). 3. Code the experiment using the new tools identified.
	Alternate Flows: If the simulation is not-working, learn about the working from the manual provided for the experiment.
Post Condition:	The experiment will be fully JavaScript based.

Use Case Number:	UC-04
Use Case Name:	Experiment 04 Simulation
Overview:	Simulation of an experiment to To study the Circular Dichroism of some substances with chiral chromophores.
Actors:	Naren Akash R J and Jalees Jahanzaib
Pre condition:	The experiment is non-existent
Flow:	Main (success) Flow: 1. Study about the activity by simulating the existing Flash-based experiment. 2. Analyze the existing code for dependencies (esp. Flash, Jmol applet). 3. Code the experiment using the new tools identified.
	Alternate Flows: If the simulation is not-working, learn about the working from the manual provided for the experiment.
Post Condition:	The experiment will be fully JavaScript based.

Use Case Number:	UC-05
Use Case Name:	Experiment 05 Simulation
Overview:	Web-based simulation of an experiment to To Study the operational details of a CD spectrometer.
Actors:	P Meena Raja Sree and Jalees Jahanzaib
Pre condition:	Requires Adobe Flash plugin support
Flow:	Main (success) Flow: 1. Study about the activity by simulating the existing Flash-based experiment. 2. Analyze the existing code for dependencies (esp. Flash, Jmol applet). 3. Code the experiment using the new tools identified.
	Alternate Flows: If the simulation is not-working, learn about the working from the manual provided for the experiment.
Post Condition:	The experiment will be fully JavaScript based.

Use Case Number:	UC-06
Use Case Name:	Experiment 06 Simulation
Overview:	Simulation of an experiment to Study the effect of Secondary Structure elements on CD spectrum of proteins..
Actors:	Mayank Goyal and Naren Akash R J
Pre condition:	Requires Adobe Flash plugin support
Flow:	Main (success) Flow: 1. Study about the activity by simulating the existing Flash-based experiment. 2. Analyze the existing code for dependencies (esp. Flash, Jmol applet). 3. Code the experiment using the new tools identified.
	Alternate Flows: If the simulation is not-working, learn about the working from the manual provided for the experiment.
Post Condition:	The experiment will be fully JavaScript based.

Use Case Number:	UC-07
Use Case Name:	Experiment 07 Simulation
Overview:	Simulation of an experiment to deconvolute the CD spectrum of a given protein solution and to classify it in terms of its secondary structure elements.
Actors:	Jalees Jahanzaib and P Meena Raja Sree
Pre condition:	Requires Adobe Flash plugin support
Flow:	Main (success) Flow: 1. Study about the activity by simulating the existing Flash-based experiment. 2. Analyze the existing code for dependencies (esp. Flash, Jmol applet). 3. Code the experiment using the new tools identified.
	Alternate Flows: If the simulation is not-working, learn about the working from the manual provided for the experiment.
Post Condition:	The experiment will be fully JavaScript based.

Use Case Number:	UC-08
Use Case Name:	Experiment 08 Simulation
Overview:	Simulation of an experiment to study the thermal stability of proteins.
Actors:	Naren Akash R J and Mayank Goyal
Pre condition:	Requires Adobe Flash plugin support
Flow:	Main (success) Flow: 1. Study about the activity by simulating the existing Flash-based experiment. 2. Analyze the existing code for dependencies (esp. Flash, Jmol applet). 3. Code the experiment using the new tools identified.
	Alternate Flows: If the simulation is not-working, learn about the working from the manual provided for the experiment.
Post Condition:	The experiment will be fully JavaScript based.

Use Case Number:	UC-09
Use Case Name:	Experiment 09 Simulation
Overview:	Web-based simulation of an experiment to study the effect of chemical denaturants on protein stability.
Actors:	Naren Akash R J and Jalees Jahanzaib
Pre condition:	Requires Adobe Flash plugin support
Flow:	Main (success) Flow: 1. Study about the activity by simulating the existing Flash-based experiment. 2. Analyze the existing code for dependencies (esp. Flash, Jmol applet). 3. Code the experiment using the new tools identified.
	Alternate Flows: If the simulation is not-working, learn about the working from the manual provided for the experiment.
Post Condition:	The experiment will be fully JavaScript based.

Use Case Number:	UC-10
Use Case Name:	Experiment 10 Simulation
Overview:	Simulation of an experiment to study the comparison between protein unfolding and protein aggregation in the presence of chemical denaturing agents.
Actors:	P Meena Raja Sree and Mayank Goyal
Pre condition:	Requires Adobe Flash plugin support
Flow:	Main (success) Flow: 1. Study about the activity by simulating the existing Flash-based experiment. 2. Analyze the existing code for dependencies (esp. Flash, Jmol applet). 3. Code the experiment using the new tools identified.
	Alternate Flows: If the simulation is not-working, learn about the working from the manual provided for the experiment.
Post Condition:	The experiment will be fully JavaScript based.