Course Project: Seat Allocation

Presented by

Cr!pt!cS

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Group Number: 10

Cr!pt!cS

Team :

- Mohammed Owais Khan(130050050)
- Kusupati Venkata Aditya(130050054)
- C.V.H.Sri Harsha(130050063)

Personal web-pages:

http://www.cse.iitb.ac.in/~owais
http://www.cse.iitb.ac.in/~kvaditya
http://www.cse.iitb.ac.in/~sriharsha

Group web-page:

http://www.cse.iitb.ac.in/~kvaditya/group.html

Project Overview

- Seat Allocation problem solved implementing two different Algorithms using Object Oriented Programming
  - **Modified Gale-Shapley Stable Matching Algorithm**
  - **Merit List Order Allocation**

Programming language used: **Java**

- GUI (WEB - UI) that allows a high school senior graduate engineering college aspirants to fill their college preferences
  - **Python GUI programming**

Programming language used: **Python 3.4**
Web application : **Django framework**

Introduction

- The project is a full packed version for the various seat allotments that take place after the entrance exams for various colleges

- It can allocate seats using two different algorithms
  - **Fool-proof Modified Gale-Shapley Matching algorithm**
  - **Merit Order list algorithm which has quite a few drawbacks**

- Web User-Interface helps the eligible aspirants to do a various set of useful tasks

Modified Gale-Shapley Matching Algorithm(MGSMA)

- We implemented the algorithm using the principles of OOP in Java
- This algorithm is fair and optimal for the seat allocation to be done after the listing of eligible candidates
- Our implementation handles the following cases efficiently
  - Foreign nationals
  - Dereservation
  - DS
  - A reserved candidate not featuring in GE-list but is in the reserved list

Output for the given test case using MGSMA

G111100093,B1
G111100105,B1
G111100327,B1
G111100459,B1
G111100469,B2
G111100690,B2
G111100778,B1
G111100829,B2
G111101131,B1

Course seat	Student
B1.GE	**G111100093**
B1.OBC	**G1111000459**
B1.SC	**G1111000327**
B1.ST	-
B1.GE-PD	**G1111000105**
B1.OBC-PD	**G11110001131**
B1.SC-PD	-
B1.ST-PD	-
B2.GE	**G1111000469**
B2.OBC	**G1111000690**
B2.SC	-
B2.ST	-
B2.GE-PD	**G1111000829**
B2.OBC-PD	-
B2.SC-PD	-
B2.ST-PD	-
B.DS.1	**G1111000778**

Merit Order List Algorithm

- The algorithm is implemented using the principles of OOP in Java

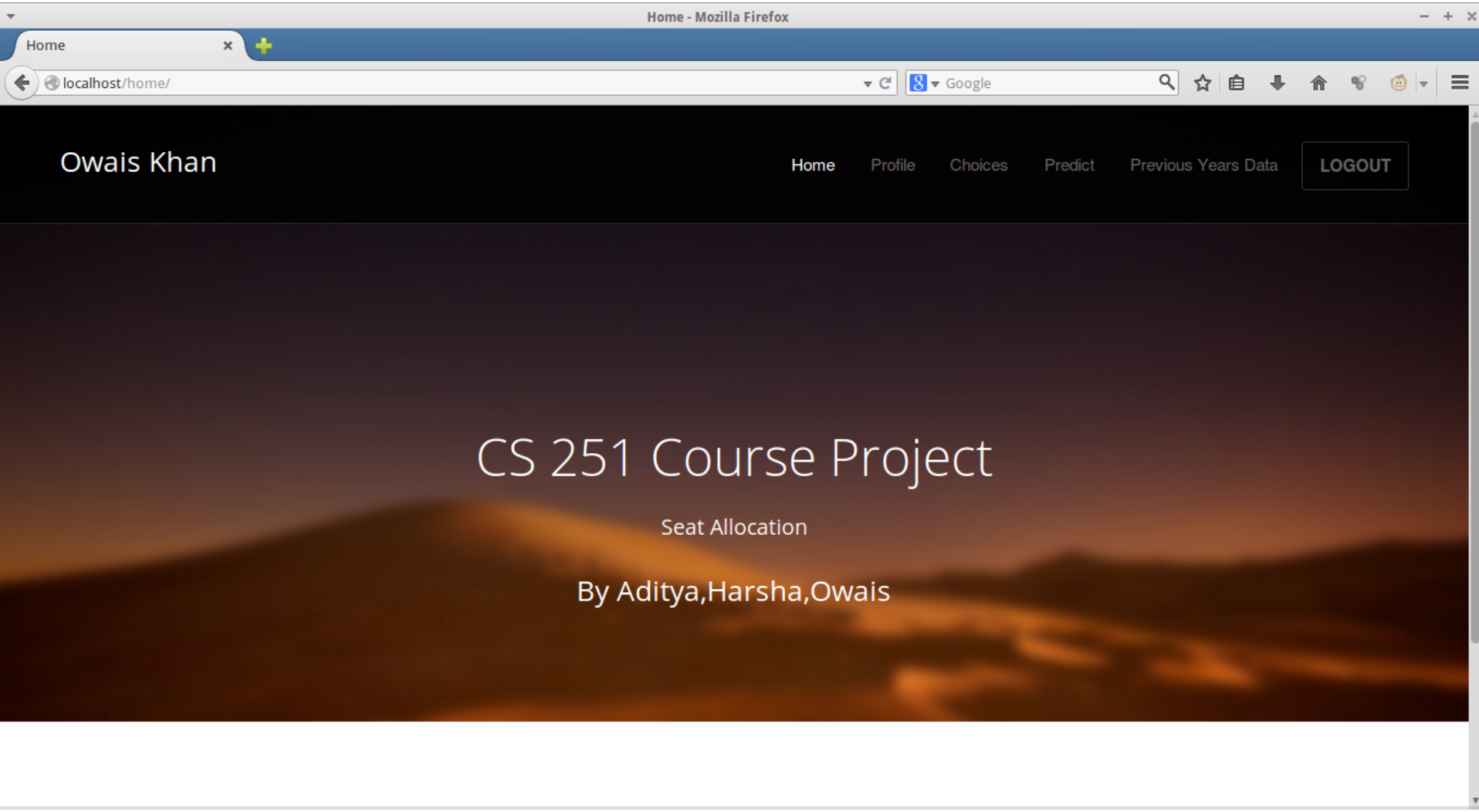
- This algorithm is fair and optimal for the seat allocation to be done after the listing of eligible candidates only to certain extent as it has a few drawbacks in
  - Dereservation
  - The case of reserved candidate not featuring in GE-list but is in the reserved list

Output for the given test case

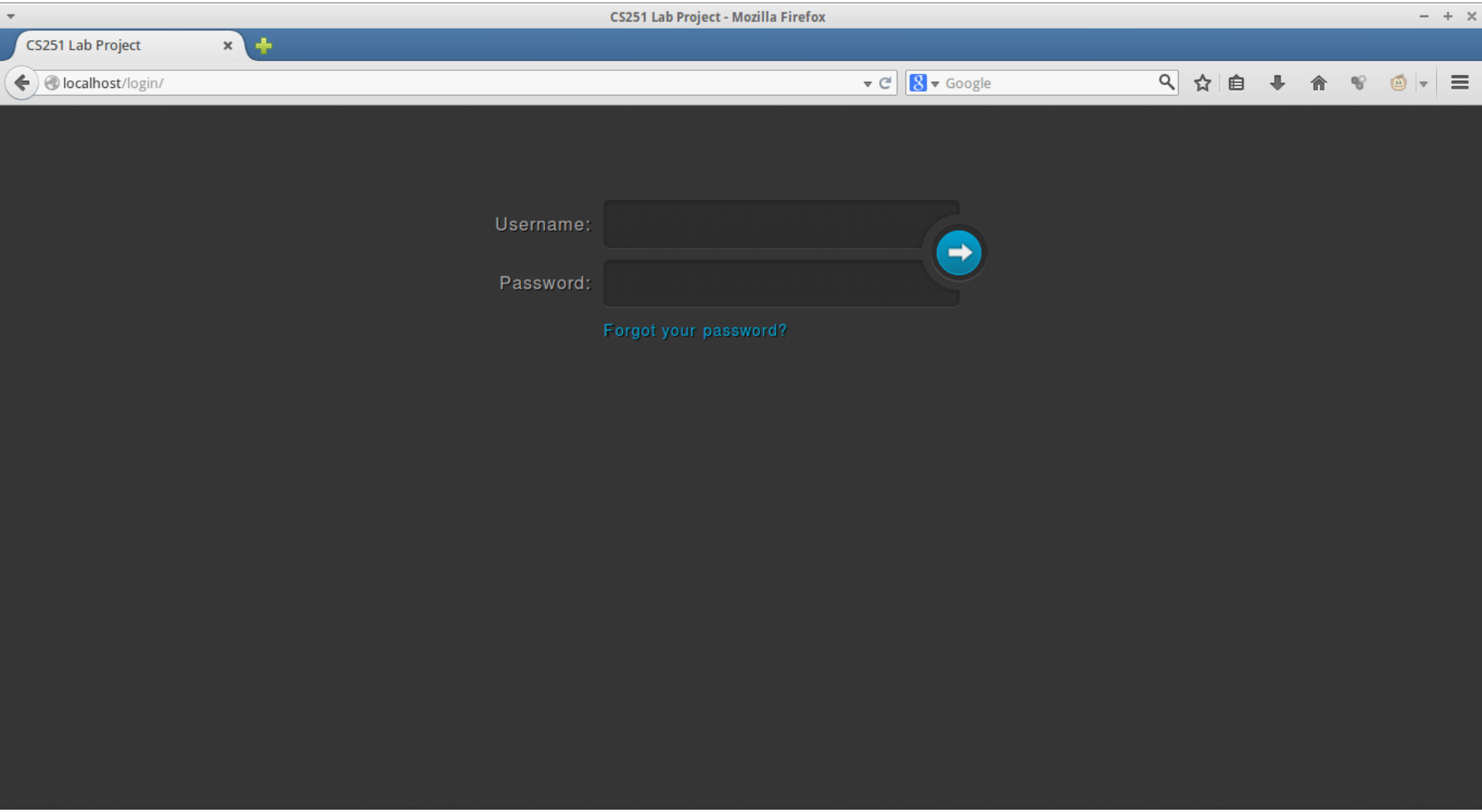
G111100093,B1
G111100105,B2
G111100327,B1
G111100459,B1
G111100469,B2
G111100690,B1
G111100778,B1
G111100829,B2
G111101131,B1

This output is after dereservation so it does not match with the given output

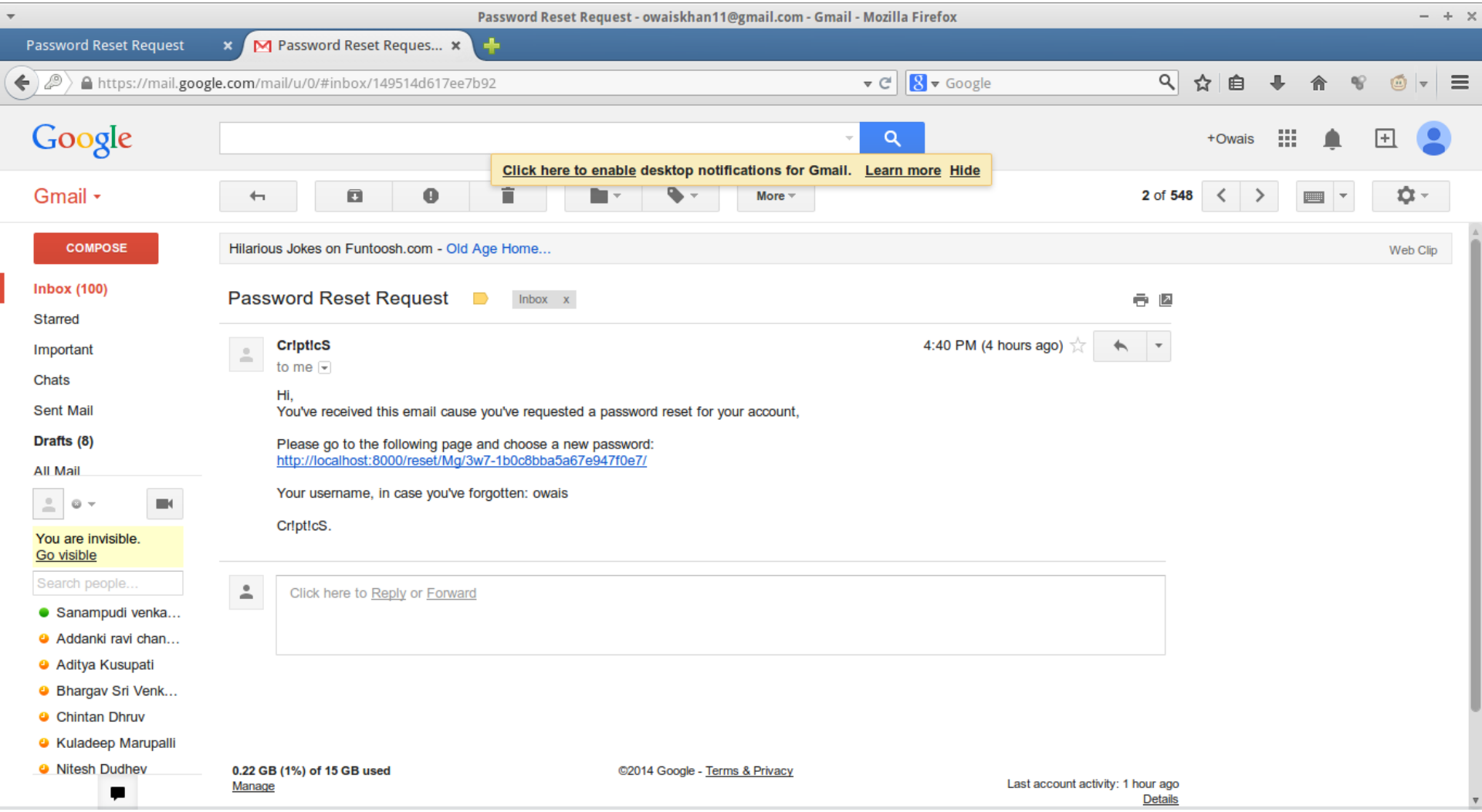
Graphical User Interface (GUI)



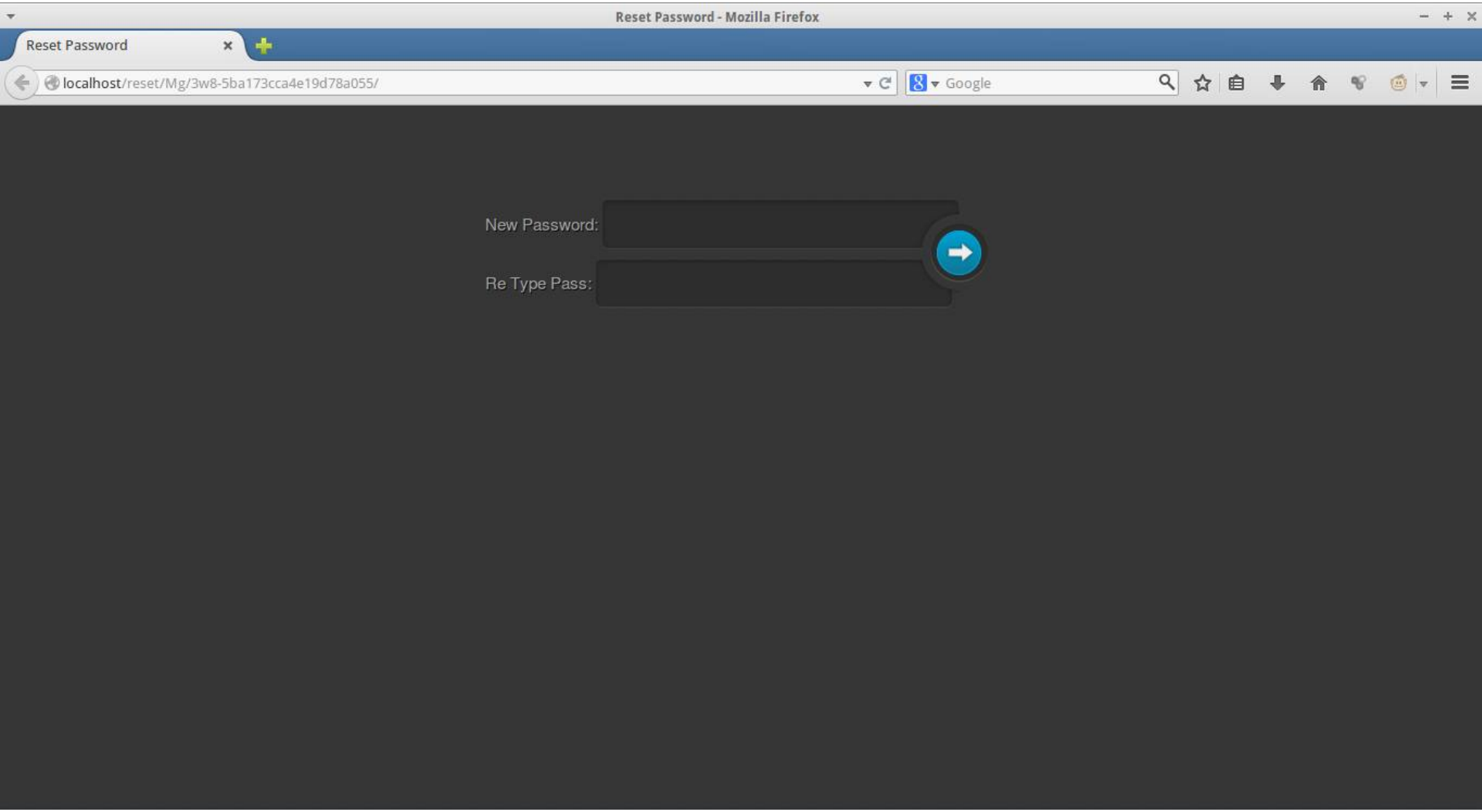
Login Option



Password reset request for Forgot password ??



Reset Password



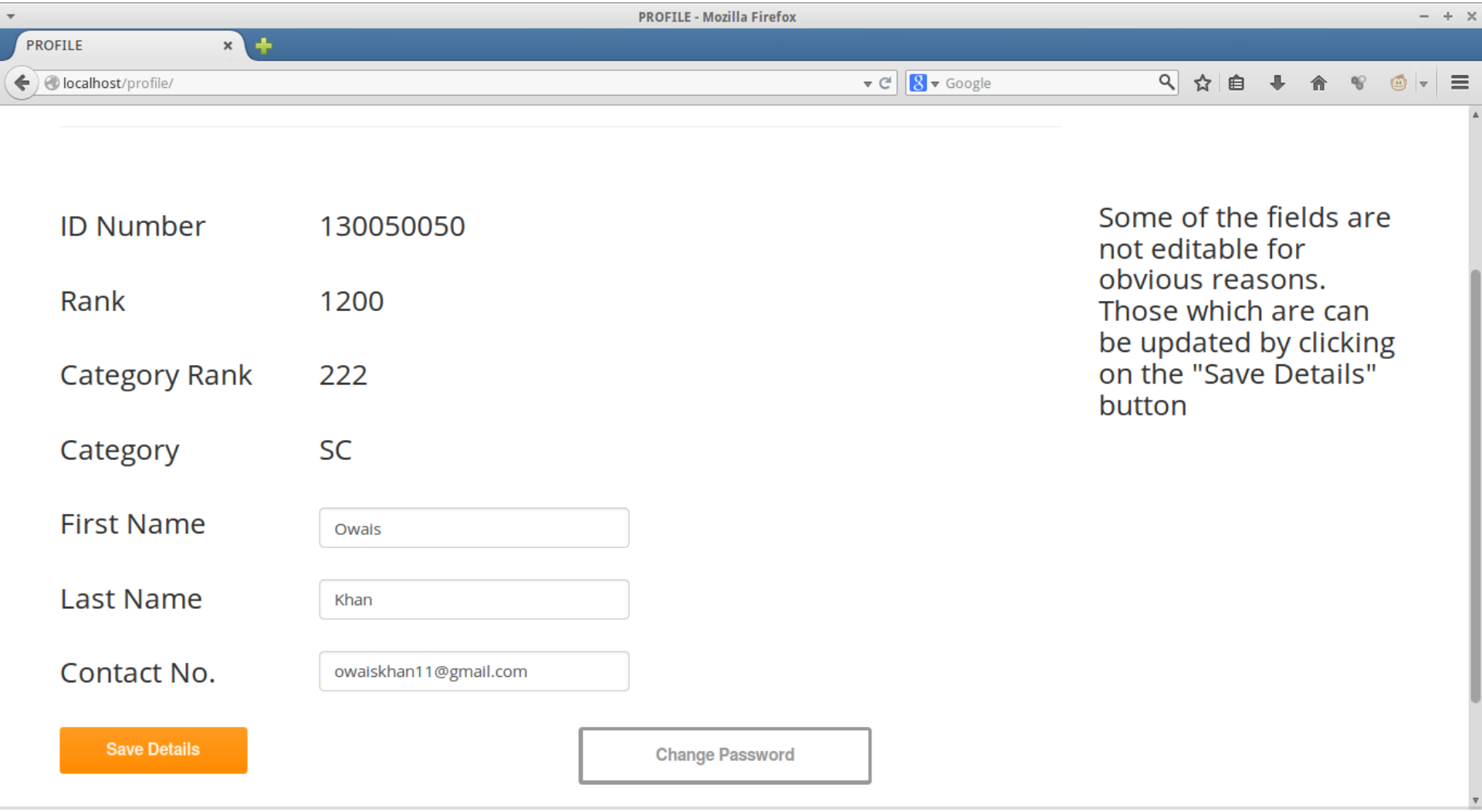
Login and Password Reset

- A database of authorised users their user id, password and their email-ids is stored

- Login uses csrf token to prevent cross site forgery.
- Passwords are stored in hashed format and makes it more difficult to get a users password

- ❖ In case you forgot your password our web application uses the smtp server provided by gpo.iitb.ac.in to send you a forgotten password request
- ❖ The request uses one time links and hence after you use the link it becomes void and can't be used by someone else to change your password

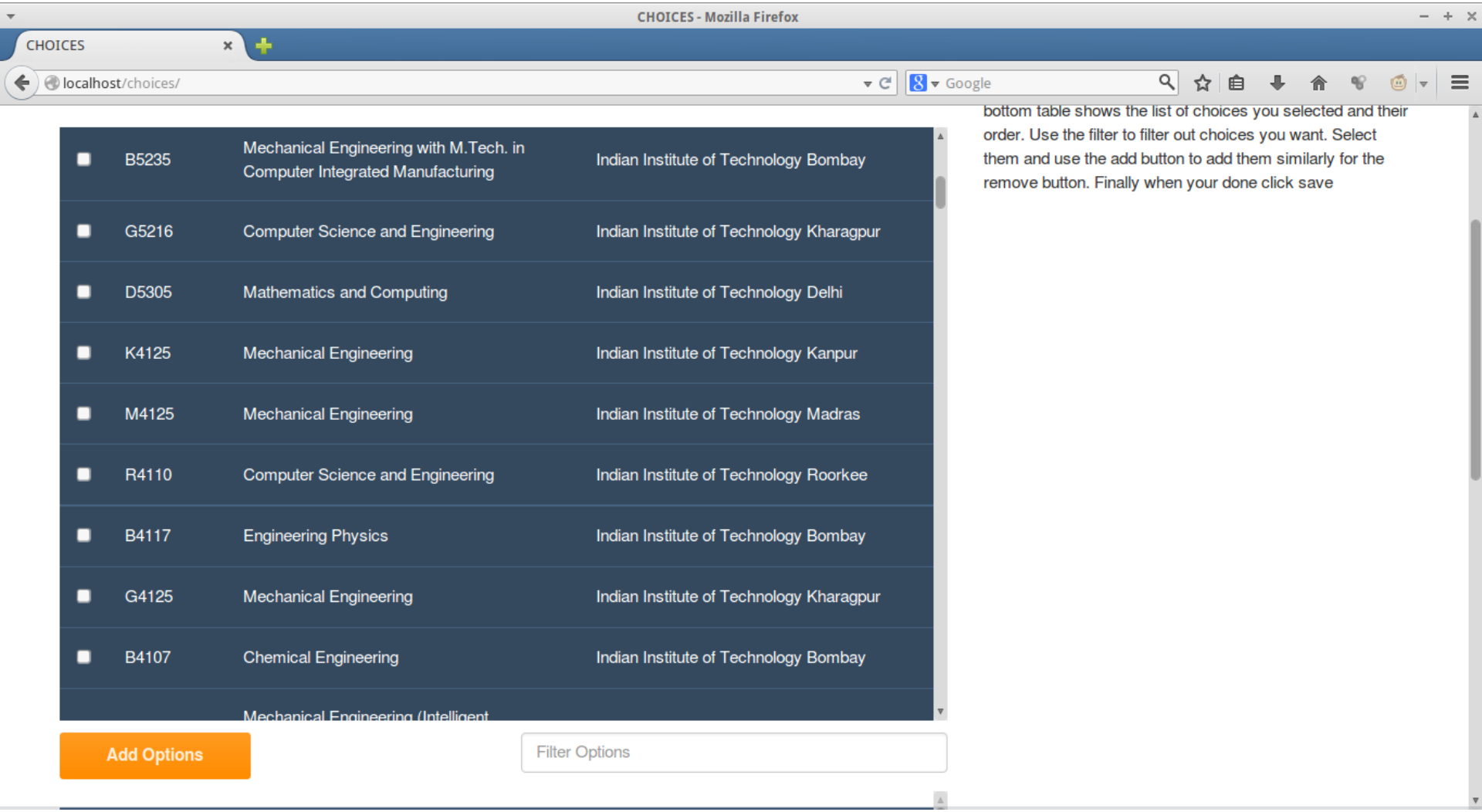
Profile



Profile

- Once you login we provide you the facility of changing your password or other related info such as your email and name
- We prevent users from changing sensitive information such as the user's rank, category

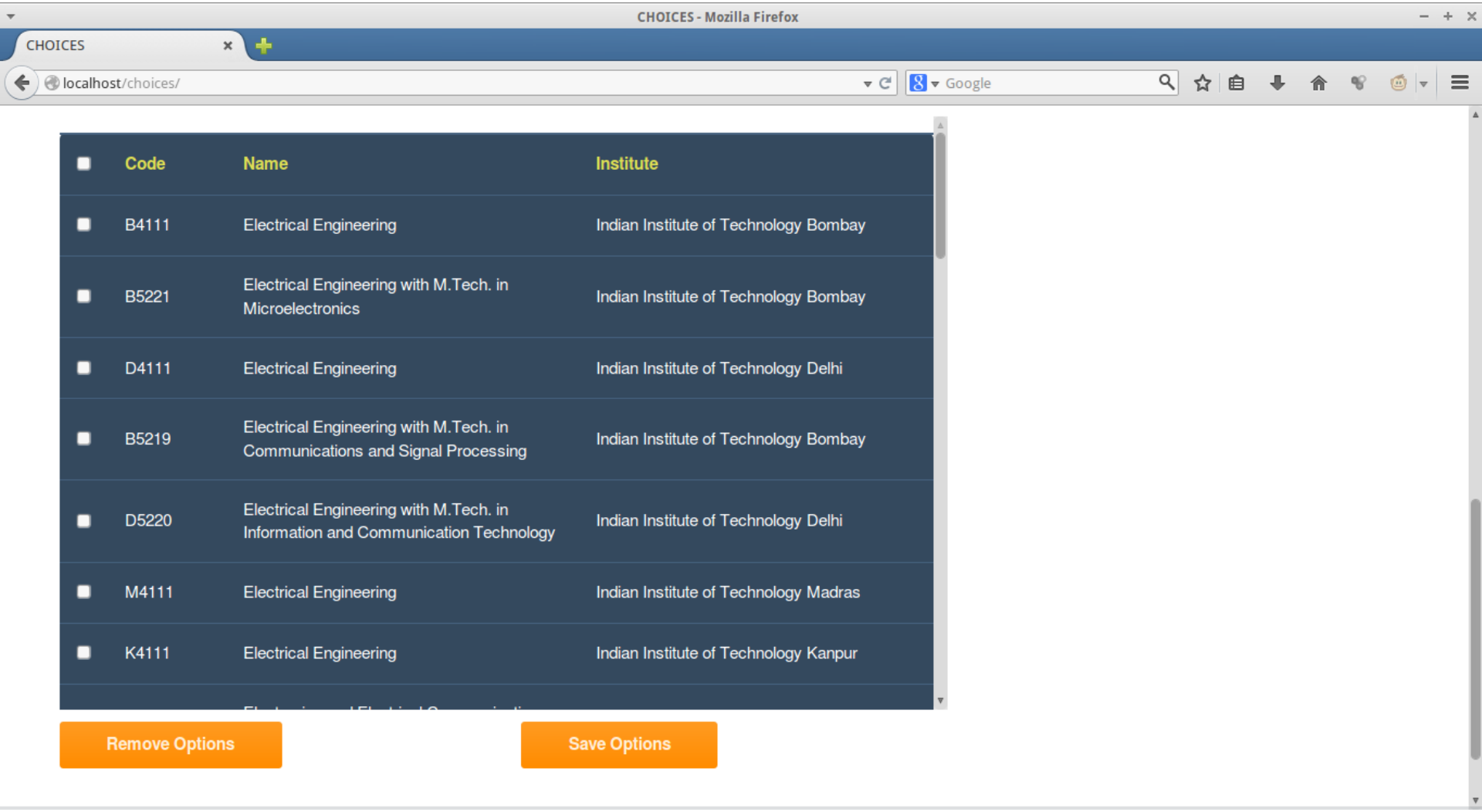
Add Choices



Add Choices

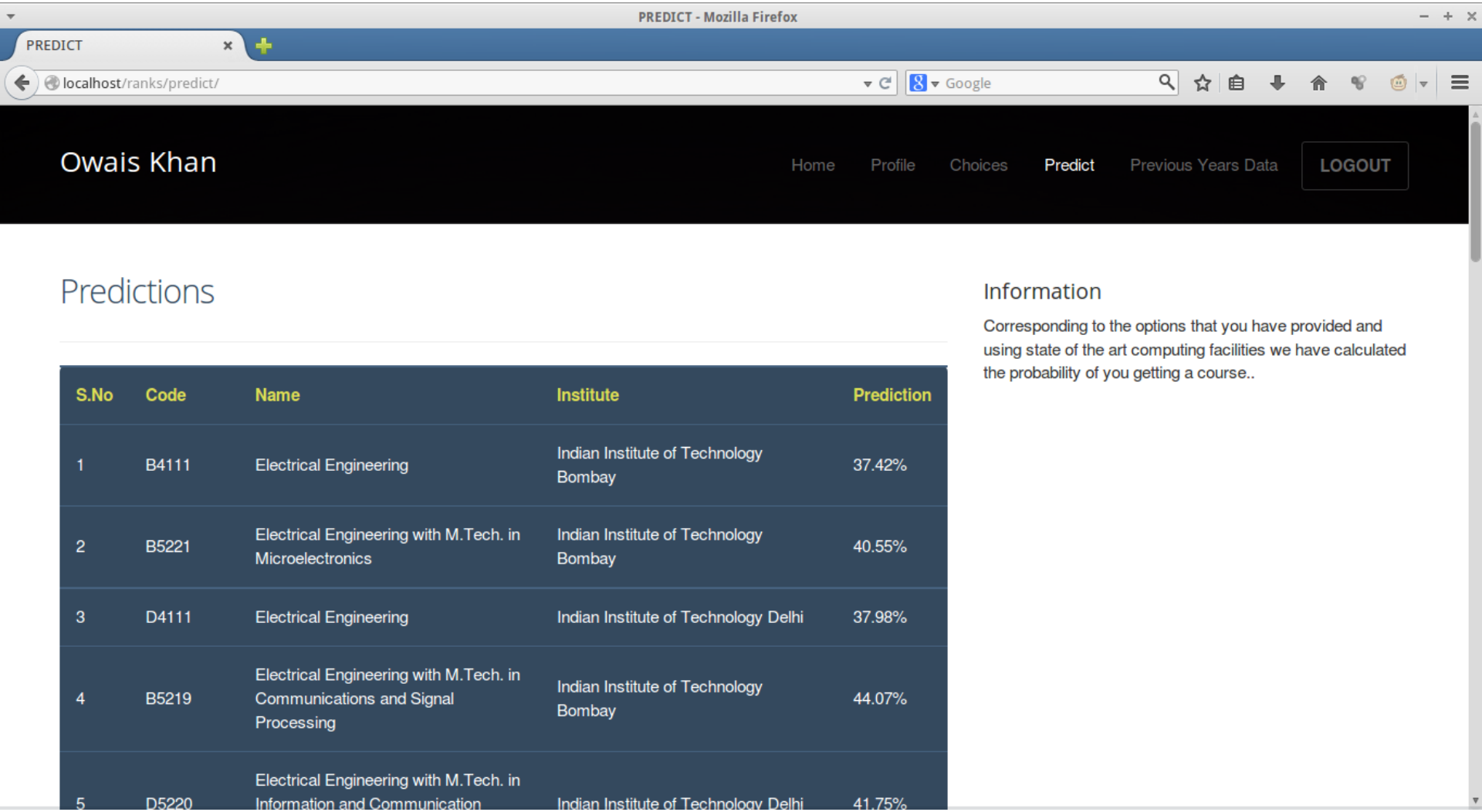
- The courses displayed are in the order of closing rank
- The user can use the search box to find the course the he/she is looking for
- The search box can also be used for filtering the courses based on the name or institute
- The check box at the top can be used for selecting all the courses that are displayed and thus makes bulk selection easier
- The order of Preference is the order in which they select and add the options
- In case of bulk selection it would be in the increasing order of closing rank

Save or Remove the Choices



- This box shows the list of courses in the preference order selected by the candidate
- The check box at the top can be used for removing all the selected courses
- The Save option helps us to hold the options for further modifications by the user

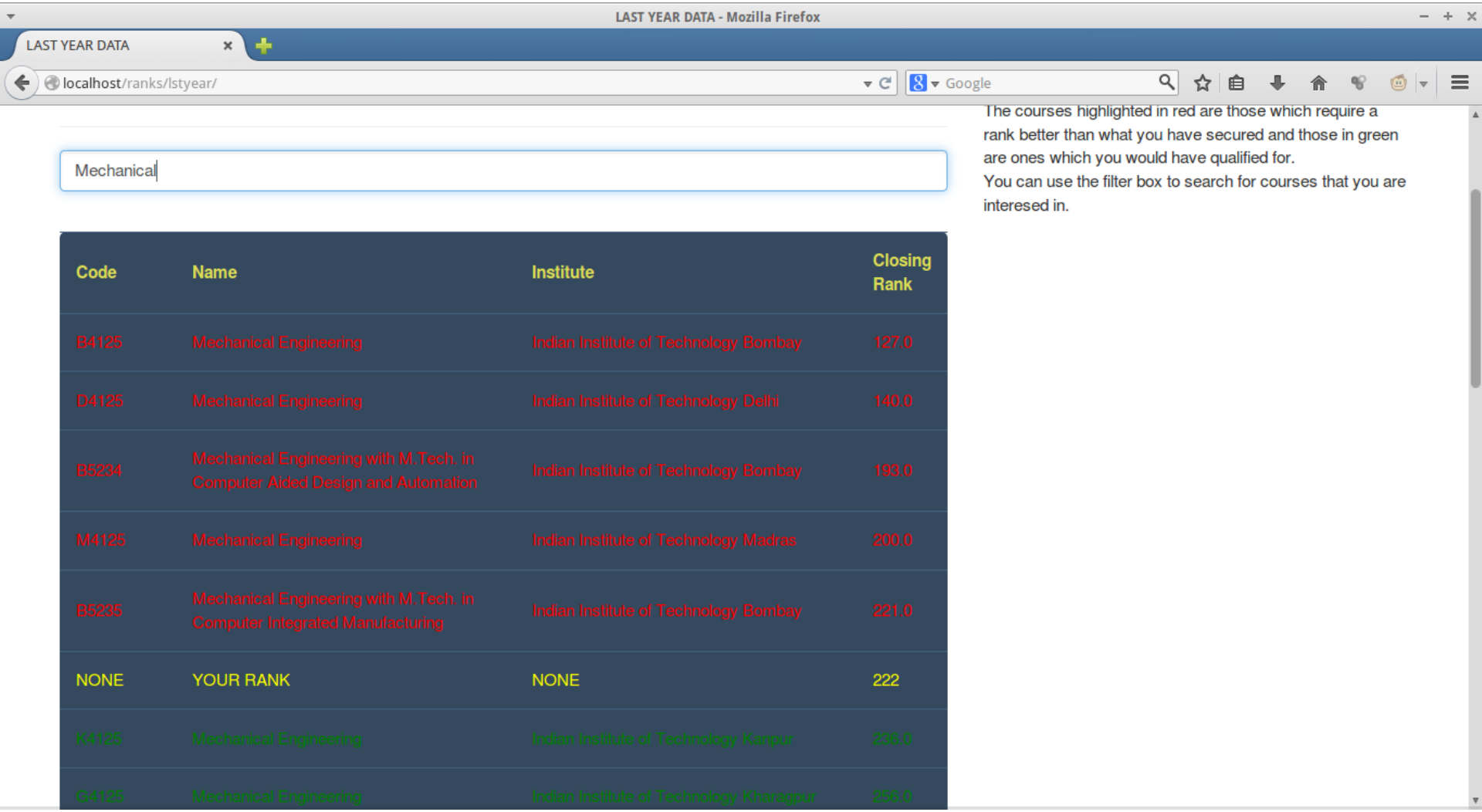
Prediction



Prediction

- For the user's rank this predicts the probability with which a candidate will get a particular course
- State of the art computing facilities and machine learning algorithms are used for this purpose
- An exponential function was assumed for the distribution and the predictions were made based on opening, closing ranks of each course along with the user's rank

Previous year data and comparer



Previous year data and comparer

- This table shows all the courses that a candidate would get selected for based on last years data
- The courses in red represent courses that require a better closing rank than that secured by the candidate and the courses in the green represent the that which the candidate would have been selected for
- The search box at the top can be used for filtering courses based on various parameters like course name , institute etc.

Usage of Previous lab knowledge

- Documented the code using doxygen (javadoc)
- HTML and CSS in the WEB UI where we needed to modify certain things in the template used

References and Citations

- WEB UI Template
  - http://www.gettemplate.com/demo/progressus/
- Django framework
  - https://docs.djangoproject.com/en/1.7/intro/tutorial01/
- Apache
  - http://httpd.apache.org/docs/2.0/misc/tutorials.html
- Java
  - http://www.tutorialspoint.com/
- Stack Overflow

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We hereby affirm that we will uphold the highest principles of honesty and integrity in all my endeavours at IIT Bombay and foster an environment of mutual respect in the institute. Further We will cite all the references taken from various sources.We will abide by the code of honour and never try to copy from other groups

130050063

Cr!pt!cs

130050054

130050050