JAVA EE

PROJECT REPORT

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Kshitij Gautam

CERTIFICATE

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ABOUT THE INSTITUTION

CMC Limited is an information technology services, consulting and software company. It was incorporated on 26 December 1975, as the 'Computer Management Corporation Private Limited'.

'Project Interact' (International Education and Research for Applications of Computer Technology), a United Nations project involving design, development and systems-engineering, computer-based systems applications in the areas of power distribution, railway freight operations management and meteorology transitioned the company to a broad IT solutions provider.

CMC Limited designed and deployed the **Indian Railways Reservation System IMPRESS (Integrated Multi-train Passenger Reservation System)** in New Delhi on 15 October 1985. It was eventually deployed all over India serving over half a million transactions every single day and cutting wait times for passengers drastically. CMC also followed it up with the design of **ARTS (Advanced Railway Ticketing System)** for unreserved ticketing.

INTRODUCTION

Java Platform, Enterprise Edition or Java EE is a widely used computing platform for enterprise software.

The platform provides an API and runtime environment for developing and running enterprise software, including network and web services, and other large-scale, multi-tiered, scalable, reliable, and secure network applications. Java EE extends the Java Platform, Standard Edition (Java SE),[1] providing an API for object-relational mapping, distributed and multi-tier architectures, and web services. The platform incorporates a design based largely on modular components running on an application server. Software for Java EE is primarily developed in the Java programming language. The platform emphasizes convention over configuration and annotations for configuration. Optionally XML can be used to override annotations or to deviate from the platform defaults.

Java EE is developed under the Java Community Process.

TECHNOLOGIES

JAVASCRIPT

In computing, **JavaScript** is a high-level, dynamic, untyped, and interpreted programming language. It has been standardized in the ECMAScript language specification. Alongside HTML and CSS, JavaScript is one of the three core technologies of World Wide Web content production; the majority of websites employ it, and all modern Web browsers supported it without the need for plug-ins. JavaScript is prototype-based with first-class functions, making it a multi-paradigm language, supporting object-oriented, imperative, and functional programming styles. It has an API for working with text, arrays, dates and regular expressions, but does not include any I/O, such as networking, storage, or graphics facilities, relying for these upon the host environment in which it is embedded.

Although there are strong outward similarities between JavaScript and Java, including language name, syntax, and respective standard libraries, the two are distinct languages and differ greatly in their design. JavaScript was influenced by programming languages such as Self and Scheme.

JavaScript is also used in environments that are not Web-based, such as PDF documents, site-specific browsers, and desktop widgets. Newer and faster JavaScript virtual machines (VMs) and platforms built upon them have also increased the popularity of JavaScript for server-side Web

applications. On the client side, developers have traditionally implemented JavaScript as an interpreted language, but more recent browsers perform just-in-time compilation. Programmers also use JavaScript in video-game development, in crafting desktop and mobile applications, and in server-side network programming with run-time environments such as Node.js.

JQUERY

jQuery is a cross-platform JavaScript library designed to simplify the client-side scripting of HTML. jQuery is the most popular JavaScript library in use today, with installation on 65% of the top 10 million highest-trafficked sites on the Web. jQuery is free, open-source software licensed under the MIT License.

jQuery's syntax is designed to make it easier to navigate a document, select DOM elements, create animations, handle events, and develop Ajax applications. jQuery also provides capabilities for developers to create plug-ins on top of the JavaScript library. This enables developers to create abstractions for low-level interaction and animation, advanced effects and high-level, themeable widgets. The modular approach to the jQuery library allows the creation of powerful dynamic web pages and Web applications.

The set of jQuery core features—DOM element selections, traversal and manipulation—enabled by its *selector engine* (named "Sizzle" from v1.3), created a new "programming style", fusing algorithms and DOM data structures. This style influenced the architecture of other JavaScript

frameworks like YUI v3 and Dojo, later stimulating the creation of the standard *Selectors API*.

Microsoft and Nokia bundle jQuery on their platforms. Microsoft includes it with Visual Studio for use within Microsoft's ASP.NET AJAX and ASP.NET MVC frameworks while Nokia has integrated it into the Web Run-Time widget development platform. jQuery has also been used in MediaWiki since version 1.16.

BOOTSTRAP

Bootstrap is a free and open-source front-end web framework for designing websites and web applications. It contains HTML- and CSS-based design templates for typography, forms, buttons, navigation and other interface components, as well as optional JavaScript extensions. Unlike many web frameworks, it concerns itself with front-end development only.

Bootstrap is the second most-starred project on GitHub, with more than 100,000 stars and 45,000 forks.

Bootstrap is compatible with the latest versions of the Google Chrome, Firefox, Internet Explorer, Opera, and Safari browsers, although some of these browsers are not supported on all platforms.

Since version 2.0 it also supports responsive web design. This means the layout of web pages adjusts dynamically, taking into account the characteristics of the device used (desktop, tablet, mobile phone).

Starting with version 3.0, Bootstrap adopted a mobile-first design philosophy, emphasizing responsive design by default.

The version 4.0 alpha release added Sass and Flexbox support.

Bootstrap is open source and available on GitHub. Developers are encouraged to participate in the project and make their own contributions to the platform.

SERVLETS

A **Java servlet** is a Java program that extends the capabilities of a server. Although servlets can respond to any types of requests, they most commonly implement applications hosted on Web servers. Such Web servlets are the Java counterpart to other dynamic Web content technologies such as PHP and ASP.NET.

Servlets are most often used to process or store a Java class in Java EE that conforms to the Java Servlet API, a standard for implementing Java classes that respond to requests. Servlets could in principle communicate over any client–server protocol, but they are most often used with the HTTP protocol. Thus "servlet" is often used as shorthand for "HTTP servlet". Thus, a software developer may use a servlet to add dynamic content to a web server using the Java platform. The generated content is commonly HTML, but may be other data such as XML. Servlets can maintain state in session variables across many server transactions by using HTTP cookies, or rewriting URLs.

To deploy and run a servlet, a web container must be used. A web container (also known as a servlet container) is essentially the component of a web server that interacts with the servlets. The web container is responsible for managing the lifecycle of servlets, mapping a

URL to a particular servlet and ensuring that the URL requester has the correct access rights.

The Servlet API, contained in the Java package hierarchy javax.servlet, defines the expected interactions of the web container and a servlet.

A Servlet is an object that receives a request and generates a response based on that request. The basic Servlet package defines Java objects to represent servlet requests and responses, as well as objects to reflect the servlet's configuration parameters and execution environment. The package javax.servlet.http defines HTTP-specific subclasses of the generic servlet elements, including session management objects that track multiple requests and responses between the web server and a client. Servlets may be packaged in a WAR file as a web application.

Servlets can be generated automatically from Java Server Pages (JSP) by the JavaServer Pages compiler. The difference between servlets and JSP is that servlets typically embed HTML inside Java code, while JSPs embed Java code in HTML. While the direct usage of servlets to generate HTML (as shown in the example below) has become rare, the higher level MVC web framework in Java EE (JSF) still explicitly uses the servlet technology for the low level request/response handling via the FacesServlet. A somewhat older usage is to use servlets in conjunction with JSPs in a pattern called "Model 2", which is a flavor of the model–view–controller.

The current version of Servlet is 3.1.

JSP

JavaServer Pages (**JSP**) is a technology that helps software developers create dynamically generated web pages based on HTML, XML, or other document types. Released in 1999 by Sun Microsystems, JSP is similar to PHP and ASP, but it uses the Java programming language.

To deploy and run JavaServer Pages, a compatible web server with a servlet container, such as Apache Tomcat or Jetty, is required.

Architecturally, JSP may be viewed as a high-level abstraction of Java servlets. JSPs are translated into servlets at runtime; each JSP servlet is cached and re-used until the original JSP is modified.

JSP can be used independently or as the view component of a server-side model–view–controller design, normally with JavaBeans as the model and Java servlets (or a framework such as Apache Struts) as the controller. This is a type of Model 2 architecture.

JSP allows Java code and certain pre-defined actions to be interleaved with static web markup content, such as HTML, with the resulting page being compiled and executed on the server to deliver a document. The compiled pages, as well as any dependent Java libraries, contain Java bytecode rather than machine code. Like any other Java program, they must be executed within a Java virtual machine (JVM) that interacts with the server's host operating system to provide an abstract, platform-neutral environment.

JSPs are usually used to deliver HTML and XML documents, but through the use of OutputStream, they can deliver other types of data as well.[4]

The Web container creates JSP implicit objects like request, response, session, application, config, page, pageContext, out and exception. JSP Engine creates these objects during translation phase.

JDBC

Java Database Connectivity (**JDBC**) is an application programming interface (API) for the programming language Java, which defines how a client may access a database. It is part of the Java Standard Edition platform, from Oracle Corporation. It provides methods to query and update data in a database, and is oriented towards relational databases. A JDBC-to-ODBC bridge enables connections to any ODBC-accessible data source in the Java virtual machine (JVM) host environment.

Sun Microsystems released JDBC as part of Java Development Kit (JDK) 1.1 on February 19, 1997. Since then it has been part of the Java Platform, Standard Edition (Java SE).

The JDBC classes are contained in the Java package java.sql and javax.sql.

Starting with version 3.1, JDBC has been developed under the Java Community Process. JSR 54 specifies JDBC 3.0 (included in J2SE 1.4), JSR 114 specifies the JDBC Rowset additions, and JSR 221 is the specification of JDBC 4.0 (included in Java SE 6).

JDBC 4.1, is specified by a maintenance release 1 of JSR 221 and is included in Java SE 7.

The latest version, JDBC 4.2, is specified by a maintenance release 2 of JSR 221 and is included in Java SE 8.

AJAX

Ajax (**Asynchronous JavaScript and XML**) is a set of web development techniques using many web technologies on the client-side to create asynchronous Web applications. With Ajax, web applications can send data to and retrieve from a server asynchronously (in the background) without interfering with the display and behavior of the existing page. By decoupling the data interchange layer from the presentation layer, Ajax allows for web pages, and by extension web applications, to change content dynamically without the need to reload the entire page. In practice, modern implementations commonly substitute JSON for XML due to the advantages of being native to JavaScript.

Ajax is not a technology, but a group of technologies. HTML and CSS can be used in combination to mark up and style information. The DOM is accessed with JavaScript to dynamically display – and allow the user to interact with – the information presented. JavaScript and the XMLHttpRequest object provide a method for exchanging data asynchronously between browser and server to avoid full page reloads.

STRUTS

Apache Struts 2 is an open-source web application framework for developing Java EE web applications. It uses and extends the Java Servlet API to encourage developers to adopt a model–view–controller (MVC) architecture. The WebWork framework spun off from Apache Struts aiming to offer enhancements and refinements while retaining the same general architecture of the original Struts framework. In December 2005, it was announced that WebWork 2.2 was adopted as Apache Struts 2, which reached its first full release in February 2007.

PROJECT - UNIVERSITY ADMISSION AND RESULT ADMINISTRATION

OVERVIEW

This project is a web based application of Java Enterprise Edition.

Various technologies of Java Enterprise Edition have been implemented to develop a **University Admissions and Result Administration Environment**. In **New Admissions section**, aspiring students can apply for admissions and in **Results section**, enrolled students can view their examination results. An **Administration section** has been provided to be accessed by the administrators to further access the database to update students' records for new admissions and results.

TECHNOLOGIES USED

Following are the technologies used in this project:

FRONTEND

- HTML5
- CSS3
- TWITTER BOOTSTRAP

BACKEND

- SERVELETS
- JSP
- JDBC

SOFTWARE USED

Following software has been used in development and maintenance of this project:

- NETBEANS
- ECLIPSE IDE
- ORACLE 10G
- APACHE TOMCAT 8.0

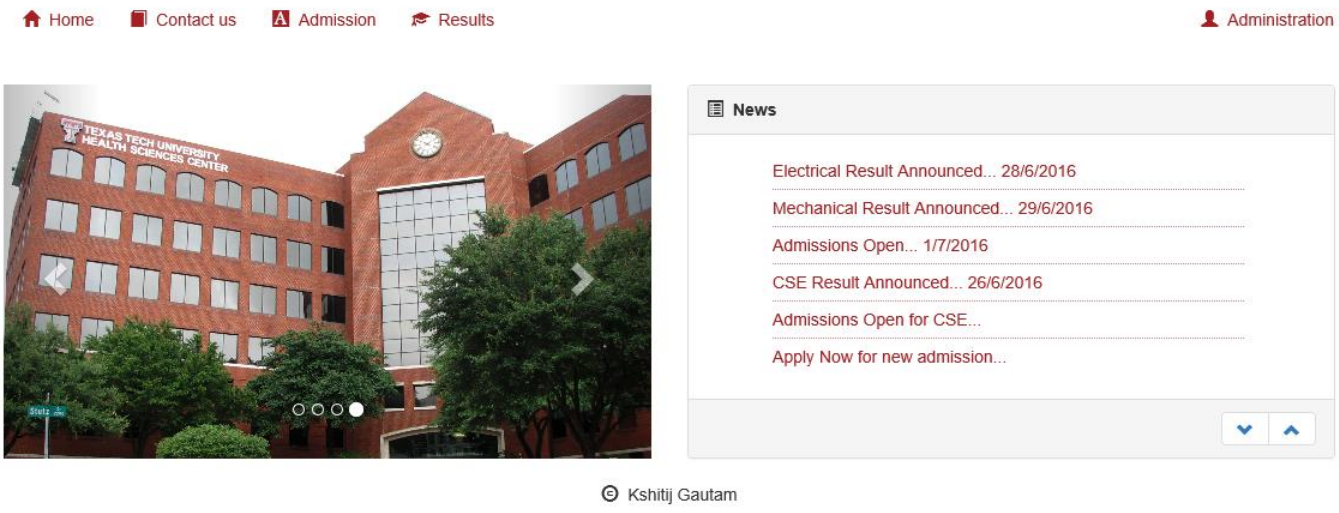
FEATURES

Various salient features of this project are as follows:

- Simple and Efficient Functioning.
- Ease of Accessibility.
- Data Security with Cookies and Session Management.
- Efficient and Fast Data Management and Manipulation with Oracle Database System.
- Design Simplicity with HTML5, CSS3 and Bootstrap Framework.

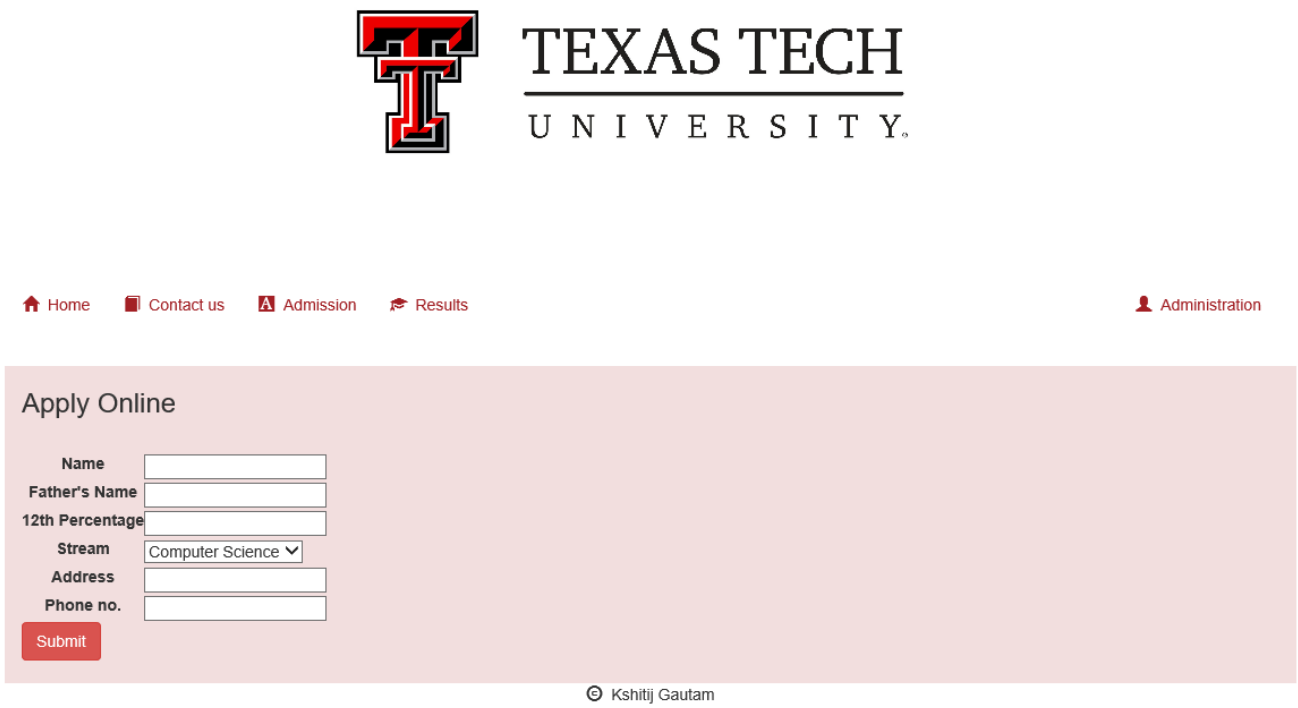
PROJECT

HOMEPAGE



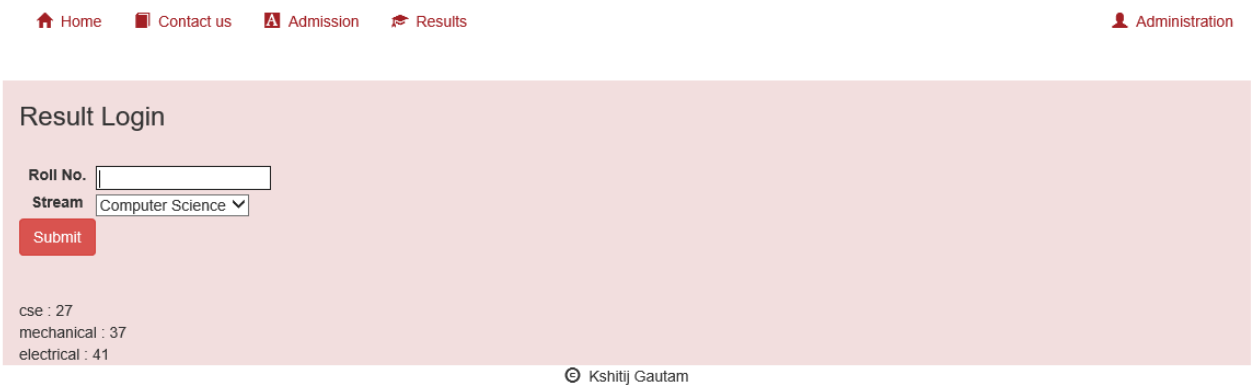
- Introductory homepage to the University to provide links to other web-pages and general information.
- Designed in Twitter Bootstrap for fast access and simple design.

NEW ADMISSIONS



- Web-page providing an application form for new admissions.
- Student data collected here is saved in the Oracle Database and can be accessed through the administration section of website.

RESULT LOGIN



- Web-page providing form to access the examination results.
- The form fetches data from the Oracle Database using servlets.

VIEW RESULT

REPORT CARD

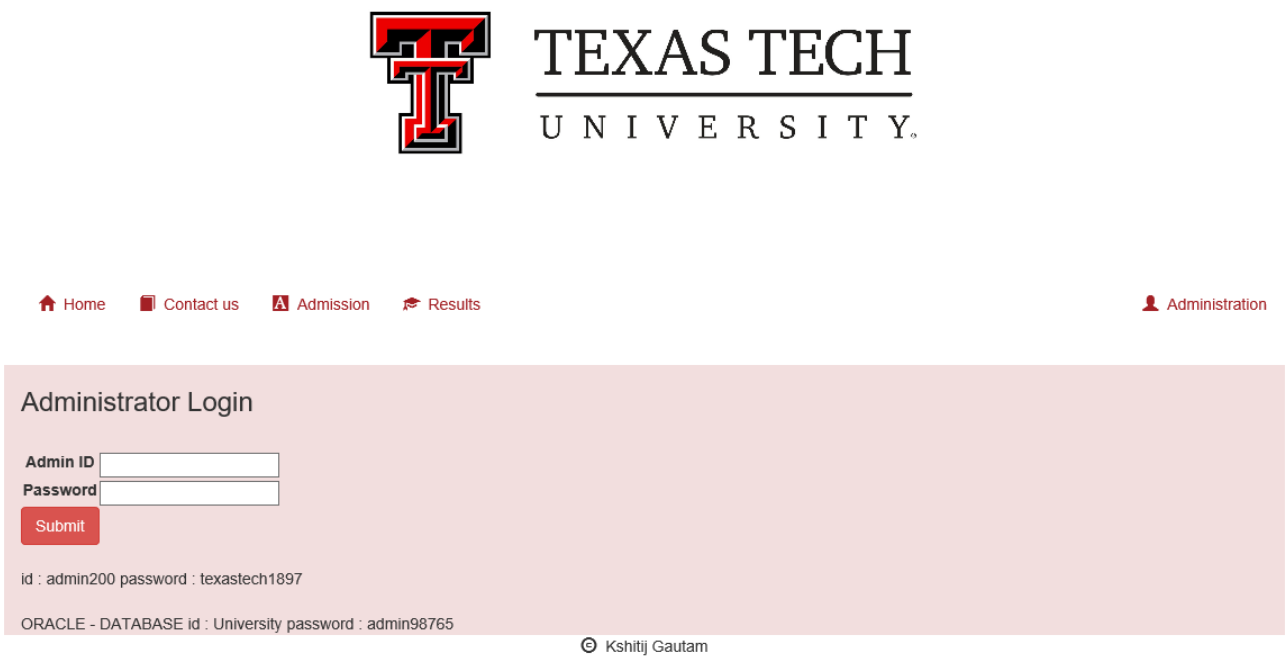
Roll No. : **27** Name : **Tyler**

Subject	Maximum Marks		Marks Obtained	Grade
Computer Architecture and Organization	100		89	A
Systems Programming	100		97	A+
Digital Electronics	100		78	B+
Data Structures	100		84	A
Theory of Computing	100		91	A+

SGPA : 8.780001 **RESULT : Pass**

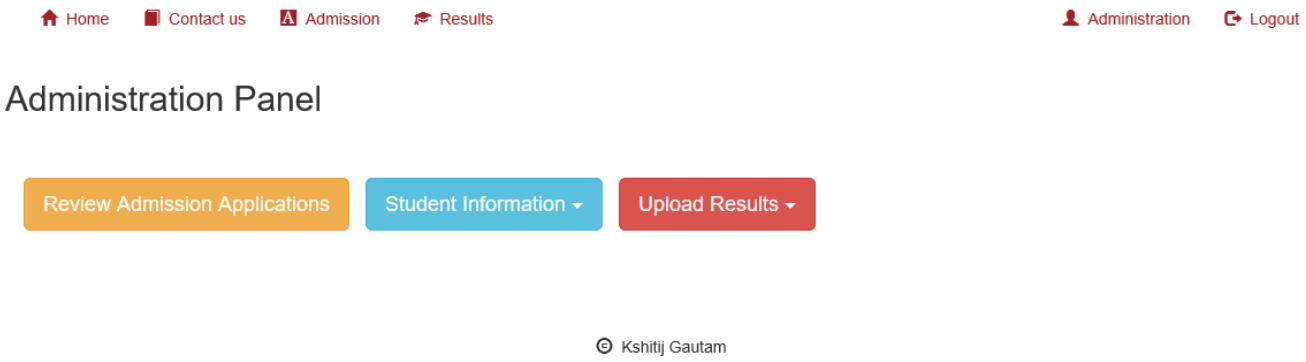
- Web-page showing the results fetched from database using the Roll no. and Stream provided on Result Login page.

ADMINISTRATOR LOGIN



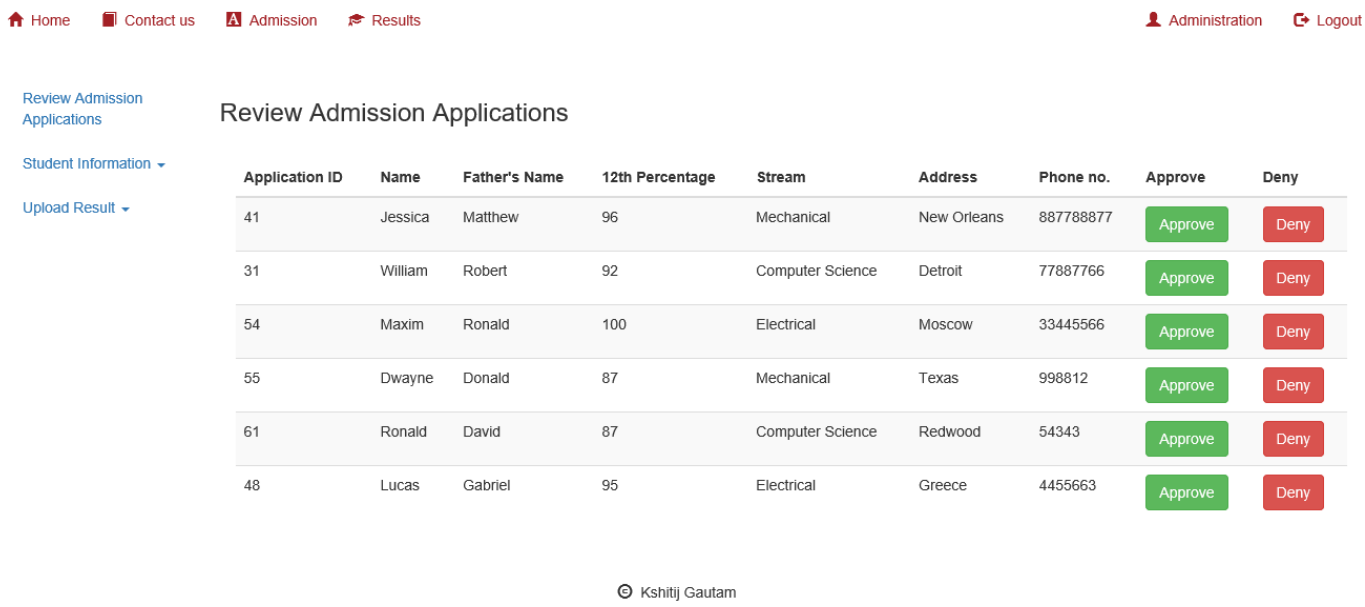
- Web-page providing form to access the Administration Section.
- Access restricted by password and secured using Session Management.

ADMINISTRATION



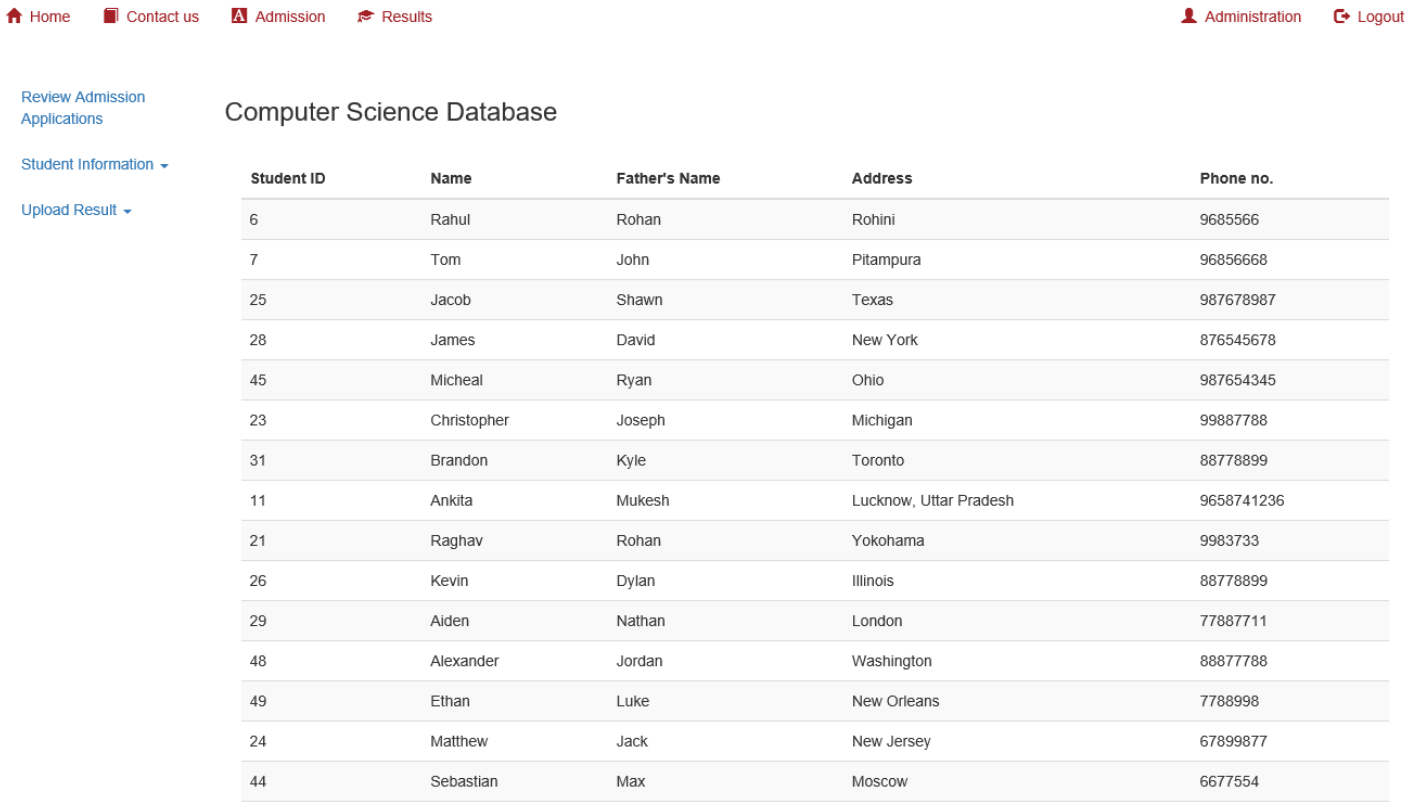
- Administration web-page providing access to the administration functionalities.
- Secured by password and Session Management.

ADMISSION APPLICATION REVIEW



- Web-page for the administrator to review admission applications.
- Data fetched from Database originally fed into it through admission forms.

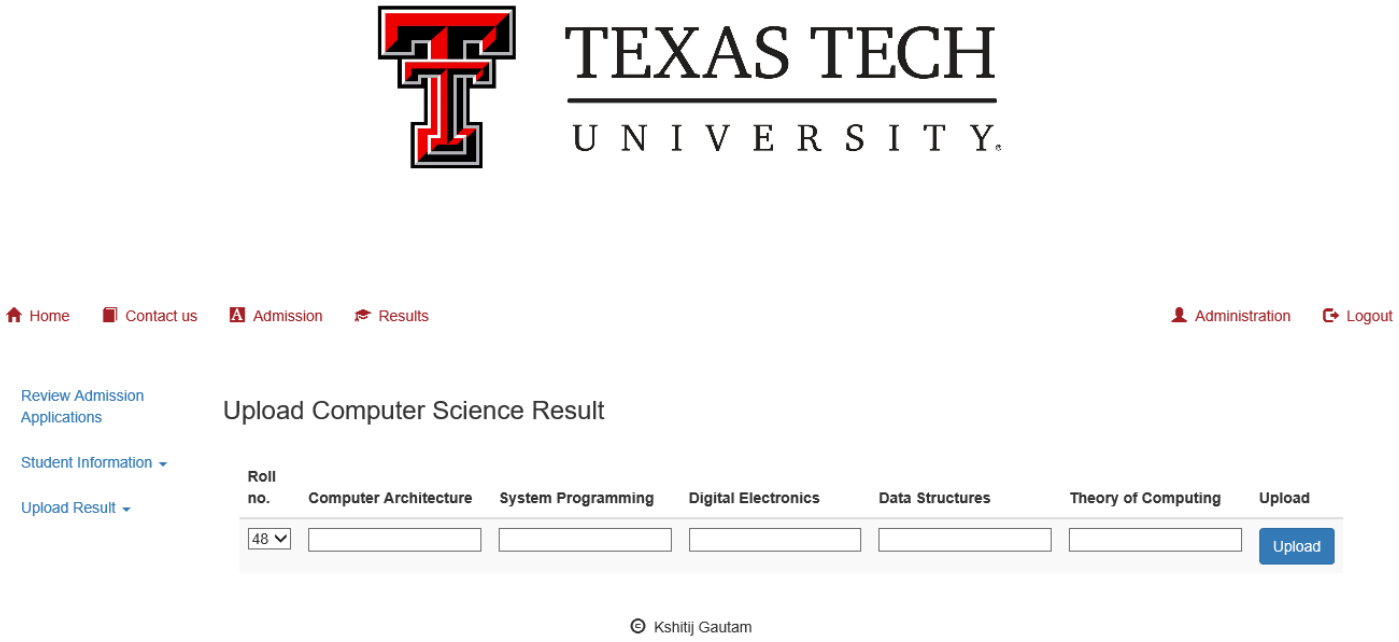
STUDENT INFORMATION



Student ID	Name	Father's Name	Address	Phone no.
6	Rahul	Rohan	Rohini	9685566
7	Tom	John	Pitampura	96856668
25	Jacob	Shawn	Texas	987678987
28	James	David	New York	876545678
45	Micheal	Ryan	Ohio	987654345
23	Christopher	Joseph	Michigan	99887788
31	Brandon	Kyle	Toronto	88778899
11	Ankita	Mukesh	Lucknow, Uttar Pradesh	9658741236
21	Raghav	Rohan	Yokohama	9983733
26	Kevin	Dylan	Illinois	88778899
29	Aiden	Nathan	London	77887711
48	Alexander	Jordan	Washington	88877788
49	Ethan	Luke	New Orleans	7788998
24	Matthew	Jack	New Jersey	67899877
44	Sebastian	Max	Moscow	6677554

- Web-page showing student data fetched from the Database

UPLOAD RESULT



- Administration form to upload student result.

FURTHER IMPROVEMENTS

Many improvements can be suggested for this project like inclusion of more features like Email Query Resolution and Attendance Management Systems as well as use of advanced MVCs like Struts2 for improved design and performance.

REFERENCES

- *http://en.wikipedia.org/*

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