



Indian Institute of Technology Bombay

CS 387: Database and Information Systems Lab

ARFA

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Introduction

ARFA is an IITJEE coaching institute. This report aims on making the reader familiar with the web app build for the institute which enables faculty members to create and conduct tests and its students to take them. The whole web app rely on two pillars: its **postgresql database** and its **Django framework**. The former home the required relations which store the important holistic information that is required to be maintained consistently which can be considered as the skeleton or the backbone of the web app. The later provides the whole definition ,nervous system and skin of the same in form of models,views and templates respectively. A well coordinated work between them brings the website to life.

Motivation

We take motivation from the project “Question Bank” provided to us. The reason for taking up this project was that there was a **great diversity** and **volume** of the questions for this pan India examination that were available in the market, thanks to the multitude of sources. This not only makes it hard for the student to keep track of his/her syllabus **completion/relative performance** but also made it hard for the faculty to set question papers. Seeing these problem and given the fact that more than a million students across India appear for the examination we couldn't resist to chose this as our course project.

Instructions To Run

Set up postgresql with any database that you want.

Update the Information about the database in /ARFA/settings.py

Start your postgresql server.

Insert data in the database using sample database /ARFA/sample_database.sql using the command

```
psql -h localhost -p <port_no> -d <database-name> < /ARFA/sample_database.sql
```

Now run the following commands

```
cd ARFA
```

```
python manage.py runserver
```

Go to your favourite browser and type in the url “<http://127.0.0.1:8000>”

Students in Sample Database:-

username	Name	phone_number	email_ID	Standard
aditya9	Aditya Raj	6789802345	ar@arfa.com	12
aarav23	Aarav Mehta	6789012345	am@arfa.com	12
mathur42	Mathur Rastogi	9987654321	mr@arfa.com	12
sneha24	Sneha Anand	8901234567	sa@arfa.com	12
chhavi18	Chhavi Sharma	5678901234	cs@arfa.com	12

Faculty in Sample Database:-

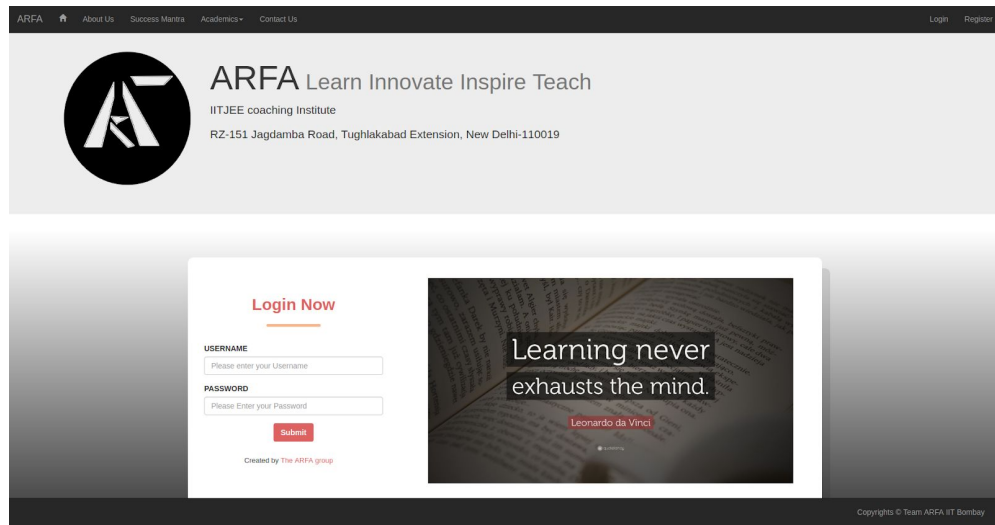
username	Name	phone_number	email_ID	subject_id
mathur55	Mathur Rastogi	7890123456	profmr@arfa.com	M
randhir98	Randhir Kumar	7890234567	rk@arfa.com	M

Note that the password is <**First_Name**>**12345678**

First Letter of first name is capital for example for both mathur42,mathur55 the password is Mathur12345678.

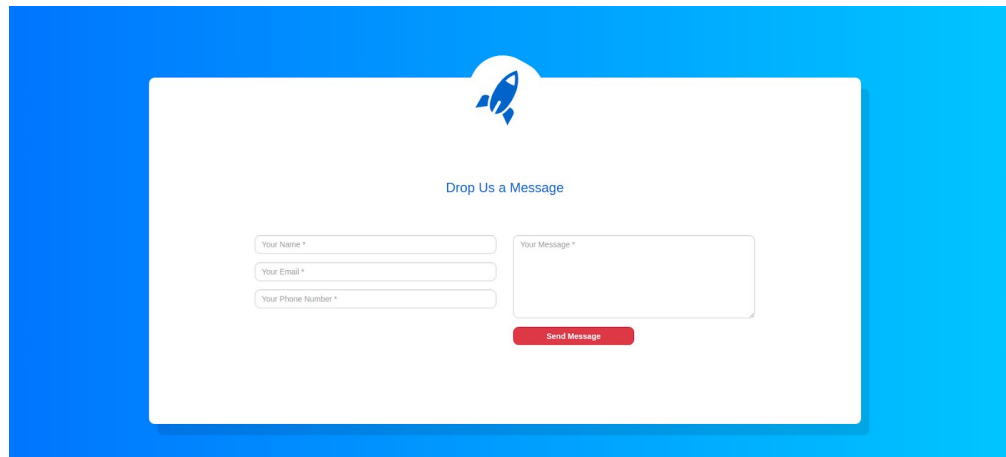
Different Interfaces

- General
 - Welcome page/Login Page



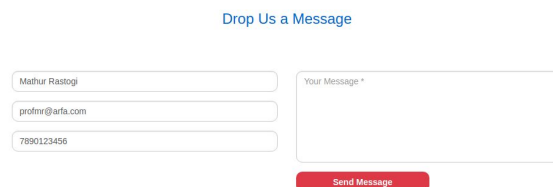
The image shows the ARFA website's welcome and login page. At the top, there is a navigation bar with links: ARFA, About Us, Success Stories, Academics, Contact Us, Login, and Register. Below the navigation bar is a header section featuring the ARFA logo (a stylized 'A' inside a circle) and the text "ARFA Learn Innovate Inspire Teach", "IITJEE coaching Institute", and "RZ-151 Jagdamba Road, Tughlakabad Extension, New Delhi-110019". The main content area is divided into two parts. On the left, there is a "Login Now" section with a "USERNAME" field (placeholder: "Please enter your Username"), a "PASSWORD" field (placeholder: "Please Enter your Password"), and a "Submit" button. Below the login fields, it says "Created by The ARFA group". On the right, there is a large image of an open book with the text "Learning never exhausts the mind." and "Leonardo da Vinci" below it. At the bottom right, there is a small copyright notice: "Copyrights © Team ARFA IIT Bombay".

- Contact Us



The image shows the ARFA "Contact Us" form. The form is set against a blue background. At the top, there is a rocket icon. Below the icon, the text "Drop Us a Message" is displayed. The form consists of four input fields: "Your Name *", "Your Email *", "Your Phone Number *", and "Your Message *". The first three fields are on the left, and the fourth is on the right. Below the input fields, there is a red "Send Message" button.


Here the LHS fields are autofield if the user has signed in as shown below



The image shows the ARFA "Contact Us" form with the LHS fields autofilled. The text "Drop Us a Message" is at the top. The form consists of four input fields: "Your Name *" (filled with "Mathur Rastogi"), "Your Email *" (filled with "profmr@arfa.com"), "Your Phone Number *" (filled with "7890123456"), and "Your Message *". Below the input fields, there is a red "Send Message" button.


- Faculty
 - Faculty Home

ARFA
About Us
Success Mantra
Academics
Contact Us
mathur55
Logout



ARFA Learn Innovate Inspire Teach
 IITJEE coaching Institute
 RZ-151 Jagdamba Road, Tughlakabad Extension, New Delhi-110019

Welcome back, Mathur Rastogi
 contact:7890123456
 ID: profmr@arfa.com
 Address: House 925, Hauz khas New delhi 110016



Tests
 0/64

Test Interface
 CREATE A Test
 VIEW MY Tests
 VIEW ALL Tests

Tests Created
2

Personal Questions
3

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- Create Test

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Logout

Create a test here

Choose which questions are to be a part of the test

Test name: test6
 Expected time for completion: 03:00:00
 Start time: 2018-11-27 07:50:00

Total Marks: 8
 Number of Questions: 2
 Set difficulty: Easy

☒ Let

$$H = \int_{-1}^1 \left(\frac{2^x \tan^2(x)}{1+2^x} + \frac{3^x \tan^4(x)}{1+3^x} \right) dx$$
 if H can be represented as

$$\frac{\left(\tan\left(\frac{\pi}{8}\right) \right)^C}{D}$$
 where A,B,C,D are non-negative integers. Then find the value of $7A + 19B + 8C + 14D$.

Difficulty: 2

marks 4 1

☒ Let R denote the set of all real numbers. I,g,h be the functions. $(f,g,h : R \rightarrow R)$ satisfying the condition

$$f(x+y) = f(x)f(y)f(xy)^{1/2}, y \in R$$

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- View Test

[View your tests here](#)

LIST OF TESTS	
<div>test6</div> <div>Start Time : Nov. 27, 2018, 7:50 a.m.</div> <div>Duration : 3:00:00</div> <div>Maximum marks : 8</div> <div></div>	<div>View Performance</div>
<div>test3</div> <div>Start Time : Nov. 27, 2018, 6:59 a.m.</div> <div>Duration : 0:02:00</div> <div>Maximum marks : 16</div> <div></div>	<div>View Performance</div>
<div>test2</div> <div>Start Time : Nov. 27, 2018, 6:48 a.m.</div> <div>Duration : 0:03:00</div> <div>Maximum marks : 16</div> <div></div>	<div>View Performance</div>

- Create Question (note Latex functionality)

- Add Content

Create a question here

Step 1 - Frame the question

Type your text here.

Subject

Maths

Save and continue

Question Text

$$\S \lim_{n \rightarrow \infty} \left[n \cdot \sin \left(\frac{1}{n} \right) \right] = 1$$

Specify question difficulty

5

Specify question visibility

Private

■ Add options (note multiple option correct functionality)

Create a question here

Step 2 - Add some options

Trick the students !!

Option 1:

51

Is this an / the answer? ☒

Option 2:

52

Is this an / the answer? ☐

Option 3:

102/2

Is this an / the answer? ☒

[Delete Last option](#) [Add an option](#)

[Previous](#) [Save and continue](#)

■ Add Image

Create a question here

Step 3 - Add some pictures

Drop images in the order you want to display

[Previous](#) [Add an image](#) [Post Question](#)

Image:

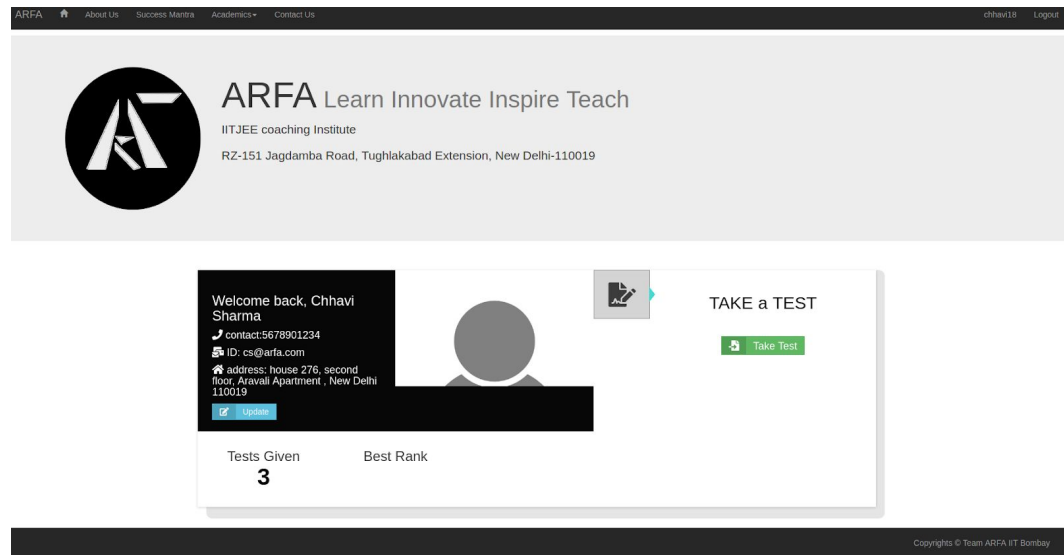
[Choose file](#) | q1.png

ImageDesc: fig1

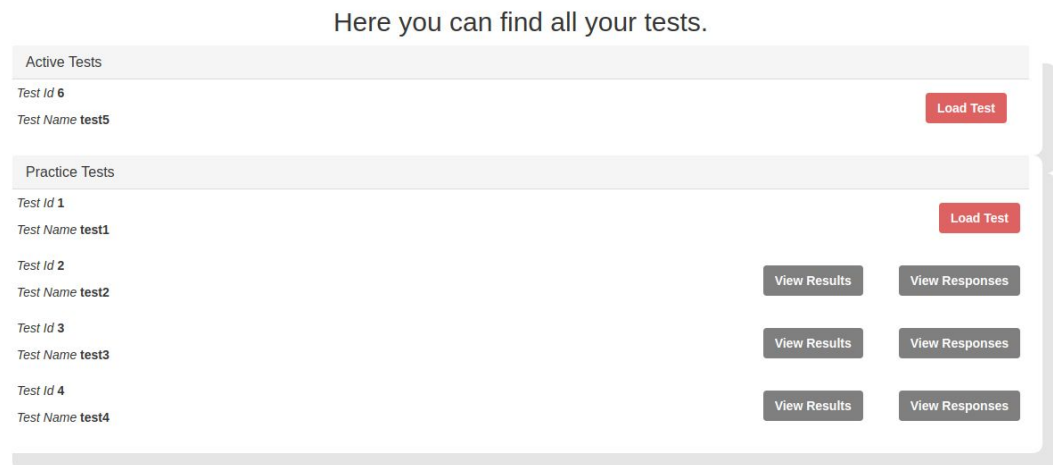
[Post the Question](#)

- Student

- Student Home



- All Test Interface



○ Take Test

ARFA
About Us
Success Mantra
Academics
Contact Us

test5

chhav18
Logout

Total Time : 0 hr 10 mins
Max Marks: 12
00:09:36

Questions

1. Consider The image. S_n represents the Perimeter of the figure. If the Limit is represented as A/B find A^2/B

Find $\lim_{n \rightarrow \infty} S_n$.

fig1

☐ 320
☐ $160\sqrt{2}$
☐ 10
☐ $32\sqrt{10}$

2. Let

$$f^{-1} \left(2^x \tan^2(x) - 3^x \tan^4(x) \right)$$

○ View Personal Responses

LIST OF QUESTIONS

Let

$$H = \int_{-1}^1 \left(\frac{2^x \tan^2(x)}{1 + 2^x} + \frac{3^x \tan^4(x)}{1 + 3^x} \right) dx$$

If H can be represented as

$$\frac{\left(\tan \left(\frac{\pi^A}{B} \right) \right)^C}{D}$$

where A,B,C,D are non-negative integers. Then find the value of $7A + 19B + 8C + 14D$.

Answers

Your Responses

☐ 0
☐ 100
☒ 85
☐ 65

☐ 0
☐ 100
☐ 85
☐ 65

Let R denote the set of all real numbers. f,g,h be the functions. $(f, g, h : R \rightarrow R)$ satisfying the condition

$$f(x + y) = f(x)f(y)f(xy) \forall x, y \in R$$

Find the value of $f(1995) + g(1995) + h(1995)$.

Answers

Your Responses

☒ 0
☐ 1
☐ 2
☐ 3

☐ 0
☐ 1
☐ 2
☐ 3

Consider the equation

$$x^2 - 853777y^2 = 1$$

- View Comparative Result



Database Design and Implementation Details

The database for the project has been constructed in *three* stages. In the first stage, necessary relations for registering users, posting questions are created. The database was constructed based on the **relational database** that we came up for designing the *web application*. We also build several web pages and their corresponding routines in this phase. We also locally saved the copies of various **css and script files** for *faster loading* of our web application pages

In the next phase, we looked into the transfer of files between the server and the application and implemented **countdown timer** and other time objects needed for the database. The files are sent as a **form data object** via **ajax asynchronous calls**, and are locally stored by the application server.

In the final phase, we analysed the data input from tests and generated **statistics** for each student and as a *whole*. This has been implemented using **triggers** which periodically checks up the pending *results* that are awaiting.

Salient Features

- **Latex and Images functionality** for questions
- **Timer Functionality** for Test
- Comparative Histogram and Charts (View Performance)
- **Triggers**
- Self Designed Logo :P
- Consistent/ Innovative UI

Acknowledgement

We would like to express our gratitude towards our **Prof S. Sudarshan** who has taught us a lot of stuff throughout the semester. He gave us the opportunity to do this delightful and enriching project and provided motivation for the same each and every time we spoke to him about it.

It was a great experience working as a team of four and bringing this site to life after sleepless nights of debugging both the frontend javascript and backend python (Django).

Declaration

The code is our own hard work and has not been taken from any other site. For reference we used the Django documentation, Stack Overflow answers and bootsnipp templates.

Challenges Faced

- Getting familiar with **Django framework** and *querying* in Django
- Implementing *triggers* which periodically perform background tasks
- *Inconsistency* in **timezone** managed by server and javascript, and also while dealing with the time objects
- Transferring files from front end to backend, using *ajax requests* needs careful construction of data, according to the *security requirements* posed by *Django*

Key Learnings

- Learned Intensive **Django** and **javascript** along with **python**, **HTML** and **Latex**
- Used **Ajax calls** and **static libraries** to make the website fast
- Learned to **design** a database **catering** to **future needs** as well
- **Realized** that web-development has many **hidden** facilities and **backend** running under the hood
- **User Convenience** and **Security** are the most important factors whenever designing a service such as this
- Implemented **Backend triggers**
- **Clean Code** = **Fast Debugging** = **Easy Understanding**
- Collaboration using **Github**

Extensions

- Extension 1 (Batches)
 - Here we analyse the performance to allocate **batches** and **scholarships**.
- Extension 2 (Authority management)
 - Here we plan to implement authority management tasks such as
 - Reading material distribution
 - Sem Wise/ batch wise syllabus completion
 - Maintenance of **online library**
 - **Scholarship** and **salary** given out
 - Fees paid by students
- Extension 3 (Feedback system)
 - We implement **feedback** system using ticket raising format for various issues or grievances student face and also about the faculty who is teaching
- Extension 4 (small tweaks)
 - **In class quizzes**
 - **House points** to incentivize students (prize = top 5 students go to ghats trip , where we can use the trek app)
 - Faculty availability