

HELWAN UNIVERSITY

FACULTY OF COMPUTERS AND INFORMATION

COMPUTER SCIENCE DEPARTMENT

SLOJ

(Smart Line Online Judge)

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Abstract

This project is a web app and it is an Online Judge that allows programmers, developers, coders, etc. to train on Problem Solving and improve their programming skills by creating contests between them, containing many problems that need to be solved by any programming language they choose.

We aim to disseminate programming as we can, because there is no science nowadays doesn't use programming somehow, actually, programming is used in our life everywhere, and Problem Solving also.

Programming and Problem Solving should be taught in schools, universities, institutes, etc. like any other science, and should be taught to kids, so that we want to invite these organizations to create profiles for them and their students and teachers on our project and use it to improve education by learning and teaching programming and Problem Solving.

Acknowledgement

First of all, we want to thank Allah for guiding us to achieve everything we done in this project.

We would like to thank our FCI-H (Faculty of Computers and Information - Helwan University) for learning and guiding us.

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Chapter 1

Introduction

1. Introduction

1.1 Overview

- “Programming is for computer only.” Bad mindset.
- Now, don’t limit your mindset like that. Programming is vast. Anything that requires logic and in need of solutions, programming can fit in.
- Overall, roughly, programming is about
 1. Solving problems,
 2. Provide solutions, and
 3. Make human life better
 4. By giving instructions, which we called as programming languages.
- Sure, we have programming for making software. We also have programming to make OS such as Windows and MacOS, to make apps, to make website and all that.
- But many people overlook that you can do programming on machine also.
- Don’t forget the embedded microchip that your coffee machine use, your car GPS and the digital watch on your wrist.
- Programming now is the important for any science, we can say there is no science doesn't need programming somehow.
- Programming should be taught in every school, university, institute, etc.
- It's also suitable for kids, youth, elderly, men and women, and it's important for all of them in their life in general.
- Programming is also used in medical system, although I have no experience in that, but those machine that the nurse used next to the patient bed, also requires programming.
 - Military drones.
 - Nuclear warheads.

- Vehicles.
 - Housing.
 - Drainage.
 - Sewage.
 - Company.
 - Marketing.
 - Etc.
- The list keeps going on and on. Why? Because programming helps to solve most of the human problems. As long as problems exist, programming will try to sneak in. The next level is Artificial Intelligence, to make computer as (almost) smart as a human, and the Internet of Things.
 - Programming is vast. Not just for computer, but for mankind.

1.2 Purpose

- The main goal of this project is to improve programming skills for programmers, developers, etc. and to teach programming to those who don't program.
- Also, to make anyone uses computers, train on programming.

1.3 Problem Definition


In general, programming is the main part of the computer science, you can't produce a software, website, system or any hardware device without programming it, even if this programming is a hardware programming, so, you need to learn programming to do that. If you learned programming, that is not enough to program, you need to practice and train on programming by Solving Problems.

Learning programming maybe easy, but if you start solving problem maybe you find it difficult, so, you need to train on solving problems more and more to solve problems.

Learn programming by any programming language you prefer, and then solve problems on SLOJ.


1.3.1 Similar projects

- Codeforces: <http://codeforces.com/>

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HOME CONTESTS GYM PROBLEMSET GROUPS RATING API RCC VK CUP HFT BATTLE

Codeforces Round #422 (Div. 2)

By [Melnik](#), 35 hours ago, translation, 

Hello everyone!







This time I'm the only one author in contradistinction to the Round 415. Many thanks to coordinator Alex [netman](#) Vistyazh for help in preparations of the round, Vladislav [winger](#) Isenbaev, Alex [AlexFetisov](#) Fetisov, Nikolay [KAN](#) Kalinin and Ildar [gainullin.ildar](#) Gainullin for testing the problems and also to Mike [MikeMirzayanov](#) Mirzayanov for Codeforces and Polygon platforms.

As in the Round 415, the main characters of the tasks will be the stunning girl Noora and hacker Leha.

Participants will be given five problems and two hours to solve them. As always, participants from the first division can take part out of competition. Scoring will be announced before the round.


I hope you'll enjoy my round. I wish everyone good luck and high rating!

[Read more >](#)

 +213    [Melnik](#)  35 hours ago  36

→ Pay attention

Before contest
[Codeforces Round #422 \(Div. 2\)](#)
16:49:03
[Register now >](#)
*has extra registration@


 Like 105 people like this. Be the first of your friends.

→ Top rated


#	User	Rating
1	tourist	3602
2	Petr	3265
3	Um_nik	3183
4	ainta	3174
5	Radewoosh	3163
6	W4yneb0t	3148
7	LHC	3139
8	izrak	3109
9	RomaWhite	3053
10	moejy0viiiiv	3051

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Educational Codeforces Round 24

By [BledDest](#), [history](#), 3 days ago, 

- URI Online Judge: <https://www.urionlinejudge.com.br/judge/en/login>

 ENGLISH
 REGISTER FORUM ACADEMIC CONTESTS PROBLEMS RANKS

THE URI ONLINE JUDGE



The URI Online Judge is a project that is being developed by the Computer Science Department of URI University. The main goal of the project is to provide programming practice and knowledge sharing.

CREDITS

URI ONLINE JUDGE

PROBLEMS & CONTESTS

SIGN UP WITH

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GITHUB BITBUCKET TWITTER

§ By signing up with Facebook, Google, LinkedIn, GitHub, BitBucket or Twitter you **AGREE** with the URI Online Judge Terms & Conditions.

You need to allow your EMAIL to be provided by the social sign in, for instance with Facebook. Therefore, allow the default permissions when prompted.

OR

NAME


EMAIL

LANGUAGE


COMPETITION AND RANKING

Solve the available problems using C, C++, Java or Python, competing with other users. As a challengee, improve your ranking, solving as many problems as possible and tuning your source code to run fast.

CHECK THE RANK



PROBLEM REPOSITORY




The URI Online Judge contains more than 1,000 problems divided in 8 big categories. This division help the users to focus on specific programming topics. All problems are available in Portuguese and English.

REPOSITORY

URI ONLINE JUDGE ACADEMIC


The URI Online Judge Academic is an unique module for professors and team coaches. Here you can create disciplines and lists of exercises. You can also track the progress of your students giving feedback in real time.

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- Browse Problems
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UVa Online Judge Members

Here you will find hundreds of problems. They are like the ones used during programming contests, and are available in HTML and PDF formats. You can submit your sources in a variety of languages, trying to solve any of the problems available in our database.

See the new [Contest Rankings](#) section at the [Live Rankings](#) link.


Now you can use the new **Quick access, info and search** option on the left menu for and easier navigation. (The tool will be updated next days for a more complete information)

 Follow us on Twitter [@UVaOnlineJudge](#) !!


Are you proud of your solutions? Do you have anything to show the rest of the problemsolvers? We're looking for people to help us in the publishing of a collection of books with solutions for the problems in the UVa Online Judge. [More information here.](#)

Coming Contests

No contests scheduled



Warmup contests in the [uHunt Training Series 2015](#)



[Categorized set of problems](#)
[From Baylor to Baylor](#)

- A² Online Judge: <https://a2oj.com/>
(NOTE: This website created by our colleague Ahmed Ali who graduated from FCI-H)

A² online Judge

» by Ahmed Aly

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1 - The practice ladders is a good way to organize your practice and to help others to practice.

2 - Each ladder will consist of a list of problems, some problems might be hidden because you have to solve some other problem(s) first (from the same ladder).

3 - Some ladders might depend on other ladder(s), you have to solve all problems in the other ladder(s) first.

4 - Not everyone can add ladders now, if you would like to be able to add ladders, please send an email to ahmed.aliy.tc@gmail.com and describe why you want to be able to add ladders.

Practice Ladders

Join a ladder from the following ladders based on your Codeforces Rating.

ID	Name	Owner	Problems Count	Users Count	Depends On
11	Codeforces Rating < 1300	ahmed_alv	100	2785	
12	1300 <= Codeforces Rating <= 1399	ahmed_alv	100	1620	
13	1400 <= Codeforces Rating <= 1499	ahmed_alv	100	1427	
14	1500 <= Codeforces Rating <= 1599	ahmed_alv	100	1222	
15	1600 <= Codeforces Rating <= 1699	ahmed_alv	100	1020	
16	1700 <= Codeforces Rating <= 1799	ahmed_alv	100	771	
17	1800 <= Codeforces Rating <= 1899	ahmed_alv	100	553	
18	1900 <= Codeforces Rating <= 1999	ahmed_alv	100	462	
19	2000 <= Codeforces Rating <= 2099	ahmed_alv	100	302	
20	2100 <= Codeforces Rating <= 2199	ahmed_alv	100	248	
21	Codeforces Rating >= 2200	ahmed_alv	100	455	

ID	Name	Owner	Problems Count	Users Count	Depends On
1	First Time To Solve	ahmed_alv	5	4279	
2	Little Experience	ahmed_alv	5	1650	1
3	The Egyptian Olympiad in Informatics EOI	gammal	25	1298	
4	Codeforces Div. 2_A	ahmed_alv	100	5546	
5	Codeforces Div. 2_B	ahmed_alv	100	3633	
6	Codeforces Div. 2_C	ahmed_alv	100	3603	
7	Codeforces Div. 2_D	ahmed_alv	100	1794	
8	Codeforces Div. 2_E	ahmed_alv	100	745	
9	Codeforces Div. 1_D	ahmed_alv	100	309	
10	Codeforces Div. 1_E	ahmed_alv	100	296	

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1.3.2 The stakeholders of our system

- Programmers and Developers
It's a training for programmers and developers because all they do is solving problems, whatever the problem is easy or difficult, small or huge.
- Coders
It's a training for coders to make their code more efficient and effective, and to improve their coding skills.
- Students
Programming is a science to be learnt, and schools, universities, institutes, etc. should teach this science.
- Teachers
As we said in the previous point, so, teachers should learn how to teach programming and train on it.
- Kids
It's like a game for kids, and it increases their intelligence.
- Anyone
Anyone wants to learn programming, developing, coding and computer science in general, actually, everyone should learn programming.

1.4 Motivation

- An online judge is an online system to test programs in programming contests. They are also used to practice for such contests. Many of these systems organize their own contests.
- The system can compile and execute code, and test them with pre-constructed data. Submitted code may be run with restrictions, including time limit, memory limit, security restriction and so on. The output of the code will be captured by the system, and compared with the standard output. The system will then return the result. When mistakes were found in a standard output, prejudgment using the same method must be made.
- Online Judges have rank lists showing users with the biggest number of accepted solutions and shortest execution time for a particular problem

1.5 Project Benefits

In general, when we talk about this system (SLOJ), that mean that we talk about programming, and as we said before that programming is important for every science nowadays.

1.5.1 Academic education benefits

- Increasing programming experience
Learning something without training on its problems is not efficient, so, if you learned programming you need to solve problems, this is the main purpose of programming.
- Getting new skills
Programming is not known as well in some countries, so that people in these countries should learn it.
- Changing problem solving thinking in general
When you solve a problem in programming that would open a way to solve problems in your life in general.
- Increasing problem solving skills
Training on solving problems increases these skills fast and efficiency.
- Understanding how computers work
This is probably the biggest benefit of all, and the one that will apply to you no matter who you are or why you're interested in learning code. After all, you use the Internet, mobile phones, computers and software in your daily life. Isn't it a bit strange that you don't fully understand how these technologies work?

1.5.2 Self-study learning benefits

- For kids:
 - Gaming
Learning programming games instead of playing it only, that would increase their intelligence.
 - Increasing thinking skills

Children have creative and fluid minds that allow them to think in a more “out of the box” way.

- For youth:
 - Job opportunities
The current generation of children will need to be literate in technology in order to be competitive in the future job market.
- For teachers:
 - Teaching (and learning) new sciences
Programming is a science to learn and to teach, so, teachers need to learn it to teach it.
 - Getting best ways to teach
Using computers a lot would make teachers get new ways to teach and to make learning easier and exciting.

1.6 Project Plan

- Actually, this project is defined in three phases, but the first phase is important, that doesn't mean that the other two phases is not important, but the project depends on the first one and the other two phases are additional to the project, so that the project can be produced by the first phase.
- The project is separated into many phases, and also every phase is separated into many tasks, so that you every member or team can do one task or more.

1.6.1 Project phases

A) First phase:

This phase is the most important phase, we can say that the whole project is this phase.

It is the main phase that *user* can register, login, logout, etc., and also *problem setter* can set the *contests* and can set *problems* with its *solution* and *test cases*, so that *solver* can enter a *contest*, solve *problems* and so on.

B) Second phase:

This phase can be defined as the second main phase after the first one. The purpose of this phase is to improve education by adding programming as a thing to learn.

Actually, it is very important for Academic Education, so that this phase can help schools, universities, institutes, etc. in teaching programming. For example, a *school* can determine a *coach*, this coach is responsible for setting *contests*, *problems*, *solutions* and *test cases* (like *problem setter*), and the *student* must enter to a *contest* and solve the *problems* and get high marks in the *contests* just like the other courses or subjects in the school.

C) Third phase:

This phase is not a main phase, it depends on the previous phase.

When we talk about *school*, exams, etc., then we need to talk about security and we need to be sure that *student* who is solving the *problems* is the same *student*, not his brother or his friend or whatever, so that we need to be sure by capturing photo by his webcam in random time and adding these photos to his *solution* and then sending it to the *coach* which determines later from comparing the photos sent to him with the *student's* pictures.

1.6.2 Tasks

A) First phase:

- *User*: registering, logging in, etc.
- *Admin*: manage, etc.
- *Problem setter*: setting contest, problems, etc.
- *Solver*: enter contest, solve, etc.

B) Second phase:

- Academy: aggregates from coaches and students
- Coach: as a *problem setter*
- Student: as a *solver*

C) Third phase:

- Searching about Computer Vision
- Capturing photos randomly
- Sending photos to coach

Chapter 2

SRS

2 SRS (Software Requirements Specification)

2.1 Introduction

2.1.1 Purpose of this document

This document is for demonstrating the requirement of Online Judge describe its scope, functional non-functional requirements and an initial version of the project plan. This document is written to be revised and assisted by the faculty members in computer science department and also to be the formal documentation of this open source project.

2.1.2 Scope of this document

This project provides various services and capabilities which are very important to the Problems Solver and students love to learn programming and make they more power in solve programming problems and make themselves test and improve their power of think in alternatives solutions and go of old way to thinking , that's because it is concerned with accelerating the solve process with providing new tools which are useful simple and integrated inside the system and set large collection of programming language , to be every one solve with the preferred language without any restrictions to use specific language .we need a software that achieve the unification we aim to and help problem solver to achieve their power in solve problems and thinking to solve in on please without go to search any tool can user or system to help them . there other point to spread programming language in school as other subject to it is important in the future.

2.1.3 Overview

The process of solve problems is still do confuse to the solver that not have confidence in his solution and need another tools to make the best out of it so all solver get tired because they look for the right tool to use and the right operation to perform when our requirement fulfilled the product will be able to help solver to make problem solve ,solution management and solution debugging and will be like wizard the user will not supposed to write any line of code out of this site to debug errors with it is various types (Syntax – runtime) errors he will use our wizard but he must agree our conditions and make sign up.

2.2 General Description

2.2.1 Product Functions

The Product functionality

- 1- log process (sign up – sign in – sign out – forget password)
- 2- user profile (add – delete – update) personal data
- 3- problems (add – delete – update – solve) add test cases choose between multiple programming language to set context of problem and to solve it.

2.2.2 Similar System Information

There are a lot of products that helped us to inspire the idea of ours like data Codeforces ,TopCoder and CodeChef, all do challenge problems to their user to solve and put also a lot of problems to user to solve to improve their level and we can integrate with them but our product will be stand alone at the first but we will integrate it with other provider servers that put challenge problem with award to benefit users and sales force but the coolest thing is that our product can be work as a standalone product or as a part of larger products.

2.2.3 User Characteristics

The experience that the user not condition to have good knowledge of problem solving process in the first once but must training if it is knowledge is not good in this branch to be able to use the functionality good ,if he has good knowledge it will be easy to use the site with all power and make it more useful ,this is our fundamental knowledge that qualify our users to use our products but there is another experiences that may be useful but the most important feature is knowing the operations of problem solving and data manipulation to user data.

2.2.4 User Problem Statement

Most users take a lot of time in preparing data to analysis the problem and use some tools do that task so the problem is the process takes a lot of time in solve and a lot of effort in thinking to writing code without errors and if you want to use wizard a lot of choices to choose from and no one give the exact what you want so developer use more than one tool.so so we seek to save developer or solver effort of search between multiple tools.

2.2.5 User Objectives

Support for write code and debugging and sign in and sign out and user manipulation personal data and the wish of the user is a standalone system without need to other tools.

2.2.6 General Constraints

The main constrain is the unification of our project the ease of use and understand and the performance of cleansing should be fast enough to compete with other software and to integrate with any other site we need in the future we should integrate with it is law and concepts to be support user all time with maximum speed of process.

2.3 Functional Requirements

- Contest Setting (import):
 - Description: this requirement is involved in putting and preparing problems in a specific format that make Understanding of problem easier the current format we are working on is the structure format.
 - Technical issues: we will design our layout of this phase using shiny and the imported data will be displayed as contest it contains on problem at first to help the user understand the structure of it the we will make the operation of the second phase on it
 - Cost and schedule: this phase in schedule prospective will take no time to implement but the cost of it will be the time the problem setter will take time to set the problem in good structure to avoid misunderstanding whenever the problem structure more easy and readable make the process of solve easier.
 - Risks: if we didn't satisfy this requirement our product will be useless cause our work depends on the problem and solutions that we import in the system although this phase is easy but is very fundamental in our project and to reduce this risk we will try to make more than one method to import data sometimes using shiny forms and other times using online web sites that run code support importing solution from it so we will try to depend on it too.
 - Dependencies: all other requirement depends on these because it feed us with problems and the other phases use this problem to benefit user and produce a result by approve his solution or no.

- Put up solutions
 - Description: this phase including put your solution using write on site and other way that support functions like upload file from your pc with any programming language Which is available among many programming languages provided to the user It also includes the constant aspiration to provide more languages and technical services more widely to make the site more power and more useful to the user and make him satisfied and solve the problem of search about another site compatible with his preferred programming language.
 - Technical issues: this phase will require using a lot of time to implement this part to run code online that support the former features and we will design the interface of it using shiny but the main implementation will be in ASP.
 - Schedule and cost: this phase will take the most of our time and it will last until the end of the implementation because we will add features in incremental fashion and the cost of it will be less than the cost of importing and sometimes will be negligible but it will take time in terms of schedule.
 - Risks: this phase is also fundamental and it is the core of our project and the most benefits of our product will be delivered by implementing it so we have to do it.
 - Dependencies: this task depends on importing task because we need the solutions to debug it and return the result of it so the importing must be implanted first.
- Link the school to the system
 - Description: This phase will deal with school and it is students and coaches the current phase we are supporting: school logo, school data, time serious and actually we can support a lot of operations that can help the school but for now we will do these only and We will develop that in the future.
 - Technical issues: we will design the interface of this phase using shiny it will be

a separated to show the resulted show and we will use single page loading it is fast and very popular in change of content Quickly to avoid loading problem.

- Schedule and cost: this phase will not require a lot of cost whether time or money but it may take some time but surely less than put up solutions to implement it.
- Risks: this phase is important to our product it is as fundamental as put up solutions but it will increase our audience cause a lot of student want to learn programming in the school but not get the way, so it must be satisfactory to their needs.
- Dependencies: this phase depends on the other phase cause after importing problem we will make put up solutions then we will make link the school to the system.

2.4 Interface Requirements

Our product will Deal with a lot of users so have different interfaces with a lot of need more functionality with more pages so our site is large and we get help from other site to help us in design.

2.4.1 User Interfaces

The user will get to the product from site he will get easy by connect to internet if he wants to see the code then after entering in our system he will import the solution then read it and make manipulation to it for consistency then he will choose whether to debugging it or debugging and published it and the extension we support for new functions.

2.4.1.1 GUI

Section 4.6

2.4.1.2 Diagnostics or ROM

We will be able to debug and diagnose the issues in our wizard based product speed using the help of server so server will be the platform of debugging and development in our product.

2.4.2 Hardware Interfaces

Our product will be cloud based and server based so on server we will strong internet access and server based we will need a single machine with regular capabilities to run the app.

2.4.3 Communications Interfaces

We will may spread our product on community like git or other places that will help to increase the evolving of our product.

2.5 Performance Requirements

We will not need a very big RAM or very powerful processor to run our app so any kind of PCs will run It

2.6 Design Constraints

Our design will be constraining by single page interface because single page will be the core in designing the interfaces and we may use other technologies like HTML, Java script and CSS.

2.6.1 Standards Compliance

We try to make our software have the most international standards programming or that are conventional between programmers to exploit every feature in our work to serve the user in the end.

2.6.2 Hardware Limitations

We don't have hardware limitations to user use our project but must have internet to be able to access the project.

2.7 Other non-functional attributes

2.7.1 Security

Security of site it is important non-functional requirement as prevent the user from entry data not we want to enter or entry by error format also prevent any one can hack system to save personal data of user also make the site work without drop by any Parasitical.

2.7.2 Reliability

Reliability very important because It will be the key to attracting the user to use our product.

2.7.3 Maintainability

Design the code and interfaces by modern way as MVC to be able make fast maintain the project if it drops down any time or if we want to add a new feature without go to any code dilemma cause a big error can make system end.

2.7.4 Portability

Portability the accept the system work on any platform this is provided through that the system is web based run on any browser from internet.

2.7.5 Extensibility

Ability to extend the project in future with MVC method help because it saves my code organize good and easy to manipulate.

2.7.6 Re-usability

Ability to reuse the code in the future in another system like it, reuse in some project which can integrated with this line of project.

Chapter 3

SDD

3 SDD (Software Design Document)

3.1 Introduction

3.1.1 Purpose of this document

- Explaining in diagrams how it works.
- Explaining things that can't be explained only with words, but need diagrams.
- Benefiting if someone wants to program it with another programming language.

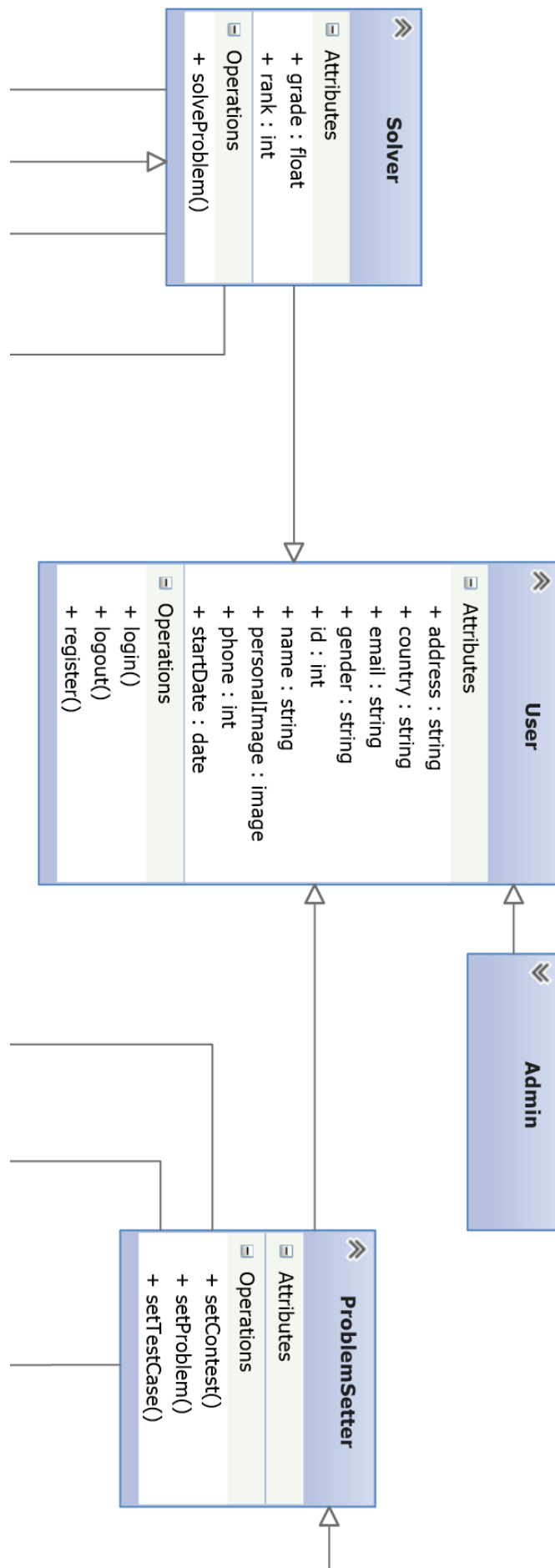
3.1.2 Overview

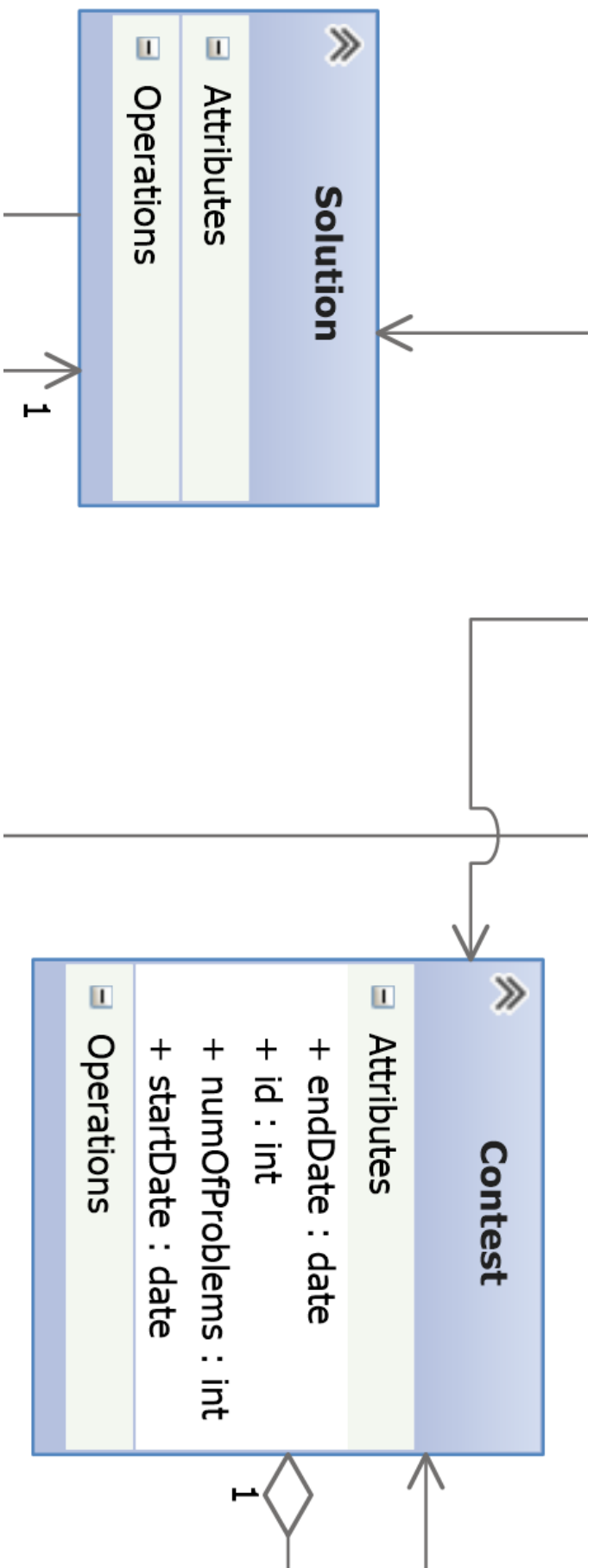
- These papers explain how the system works and its inside and outside components, so that you can understand how the system programmed.
- This system is programmed by ASP.NET, so, if anyone wants to program it with any other programming language, these papers will benefit him.

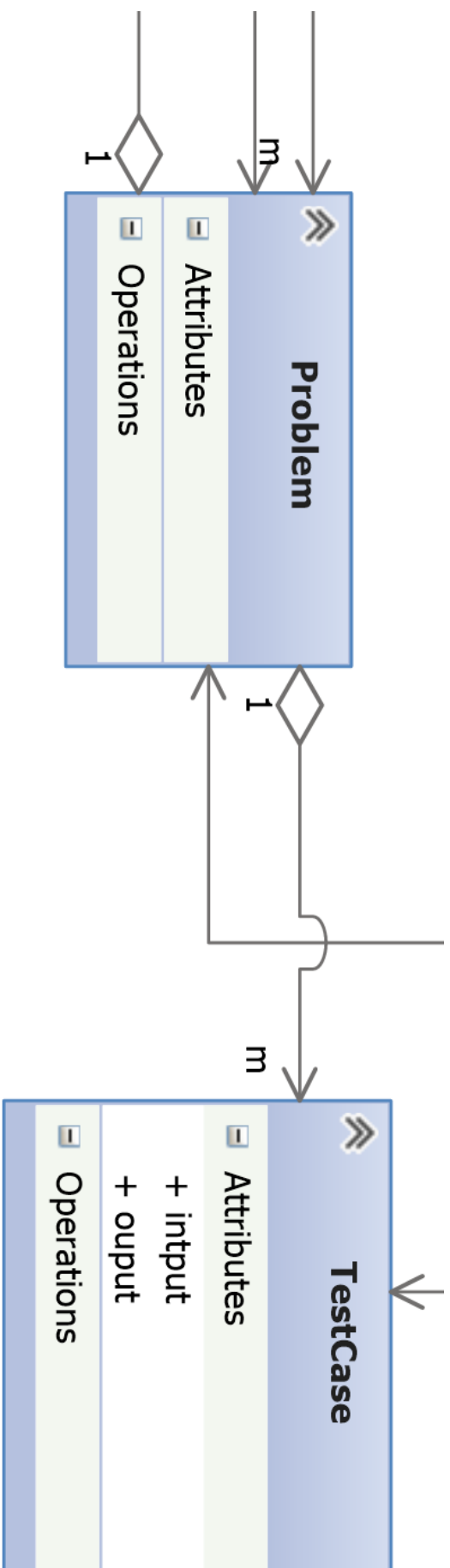
3.1.3 Intended Audience

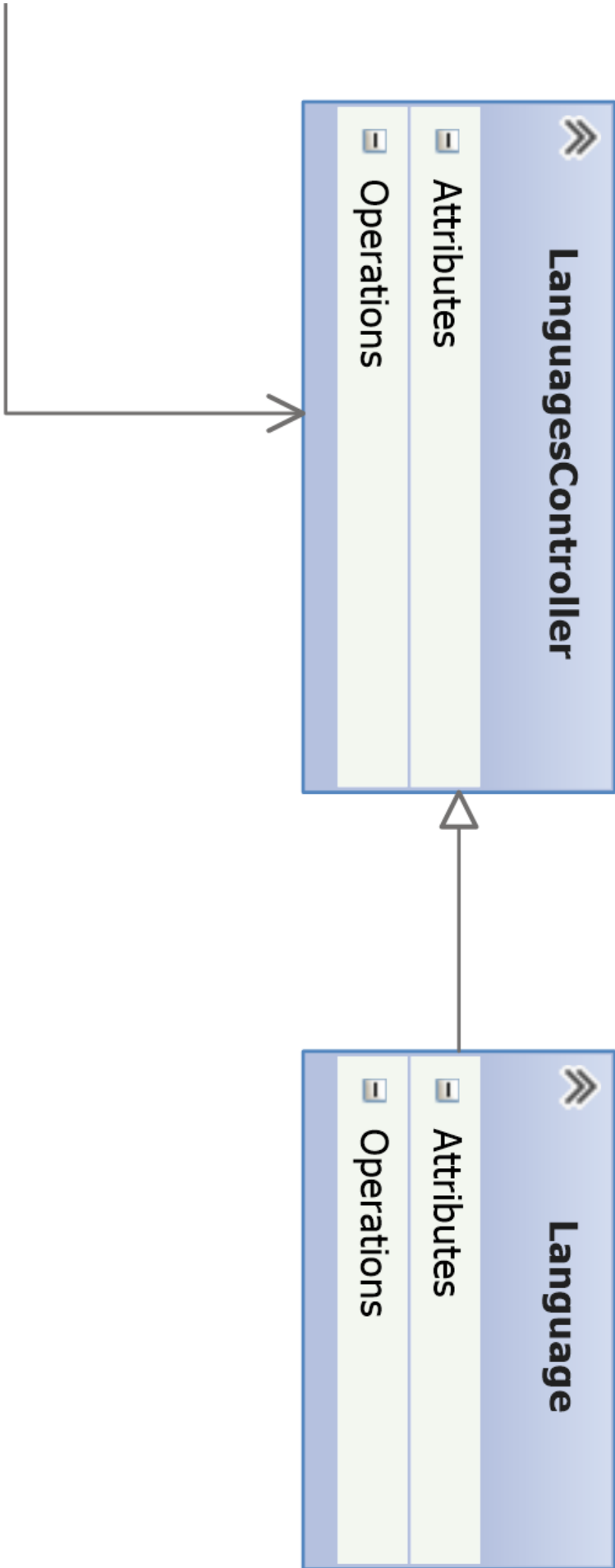
The Audience of this paper should be developer and have minimum knowledge of programming and developing, and minimum knowledge of the software engineering and its requirements.

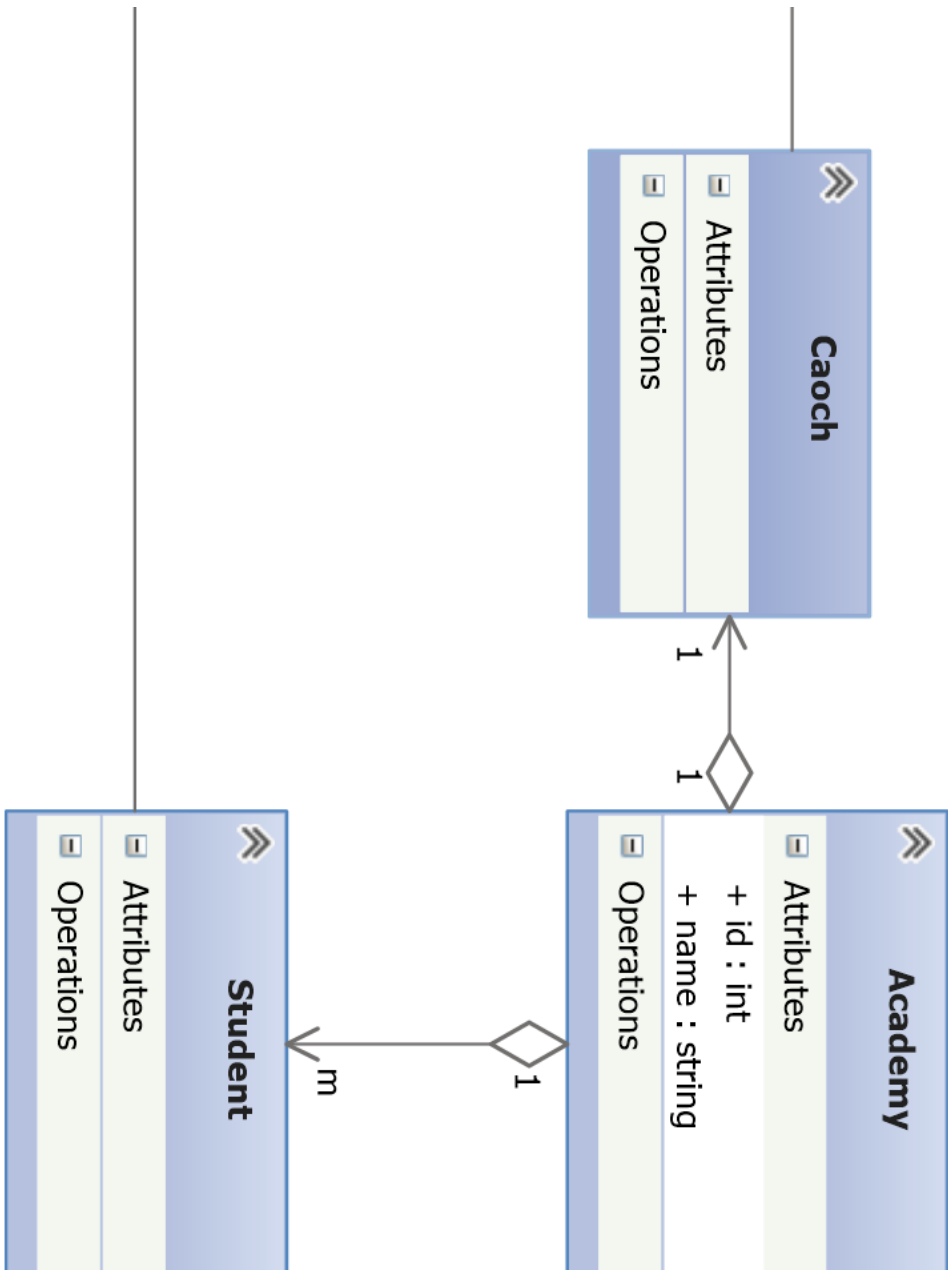
3.2 Class Diagram

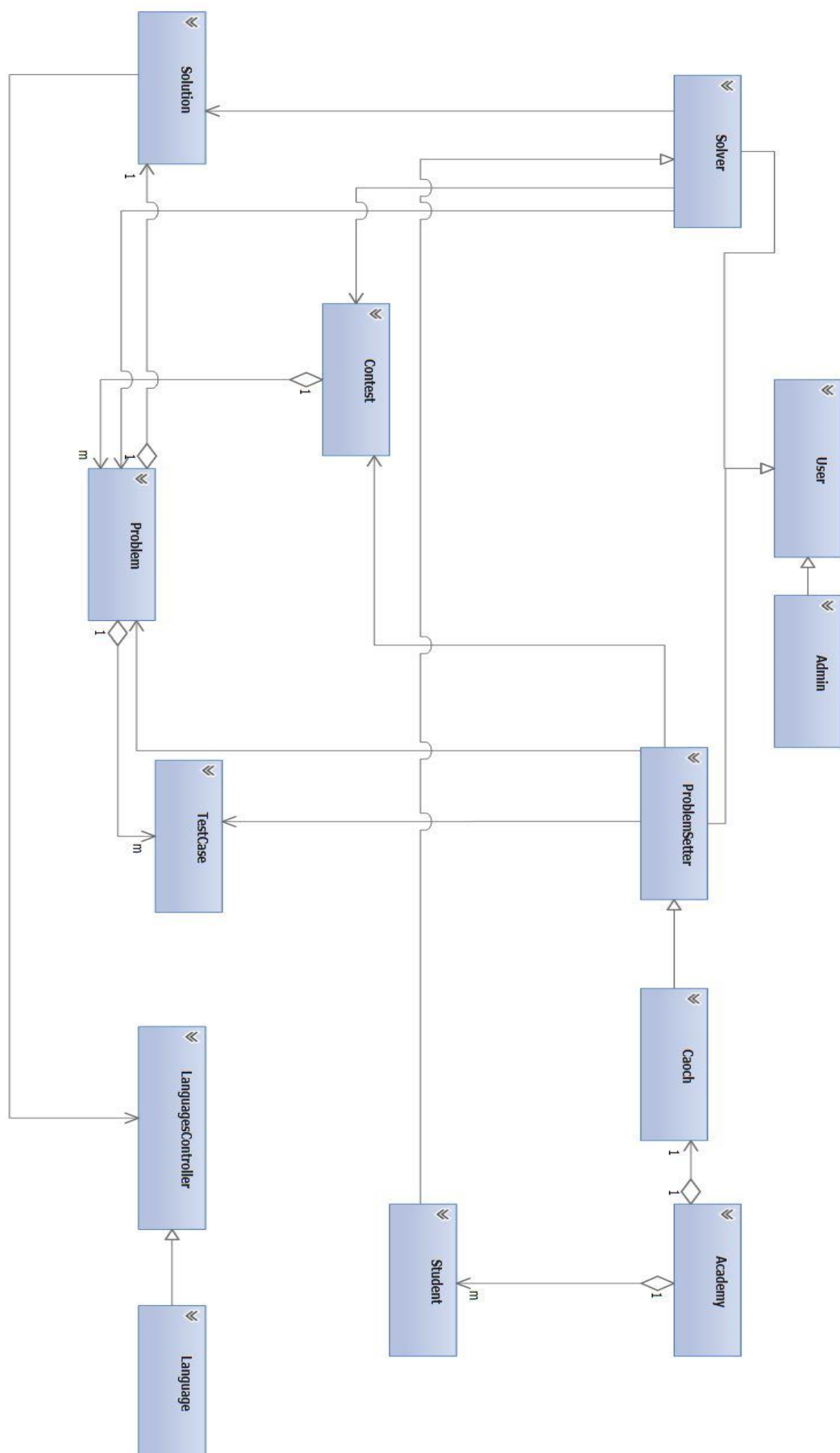




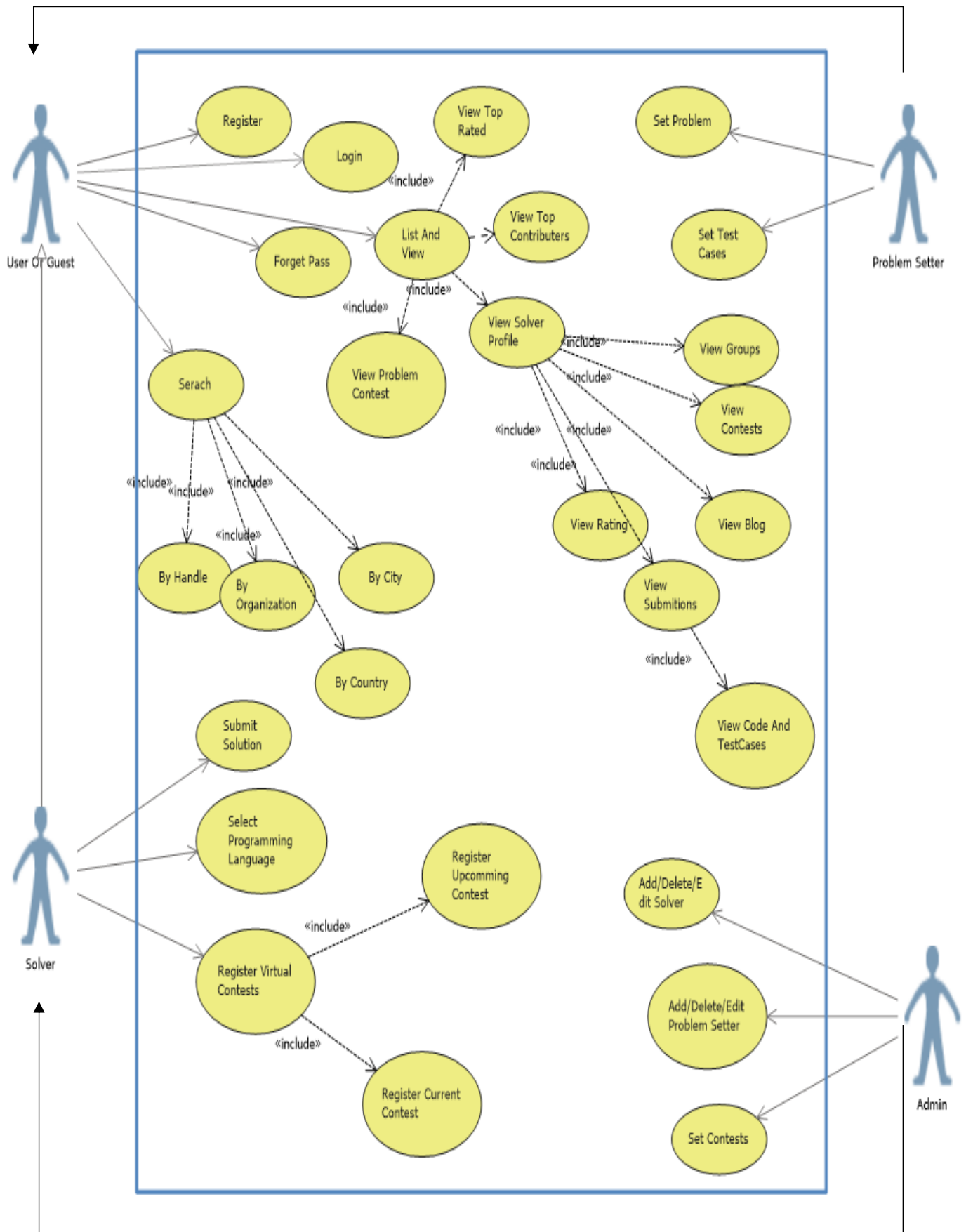




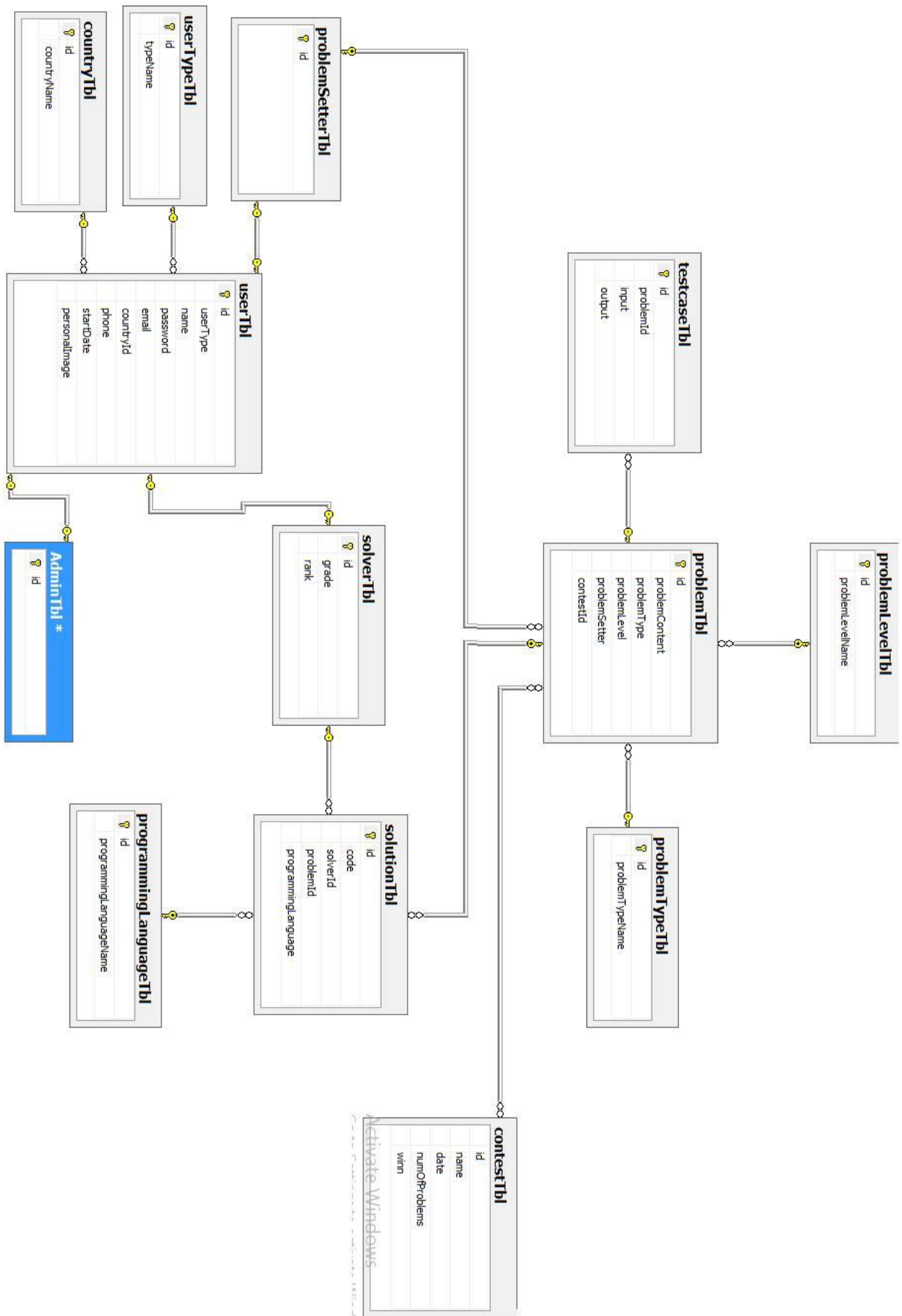




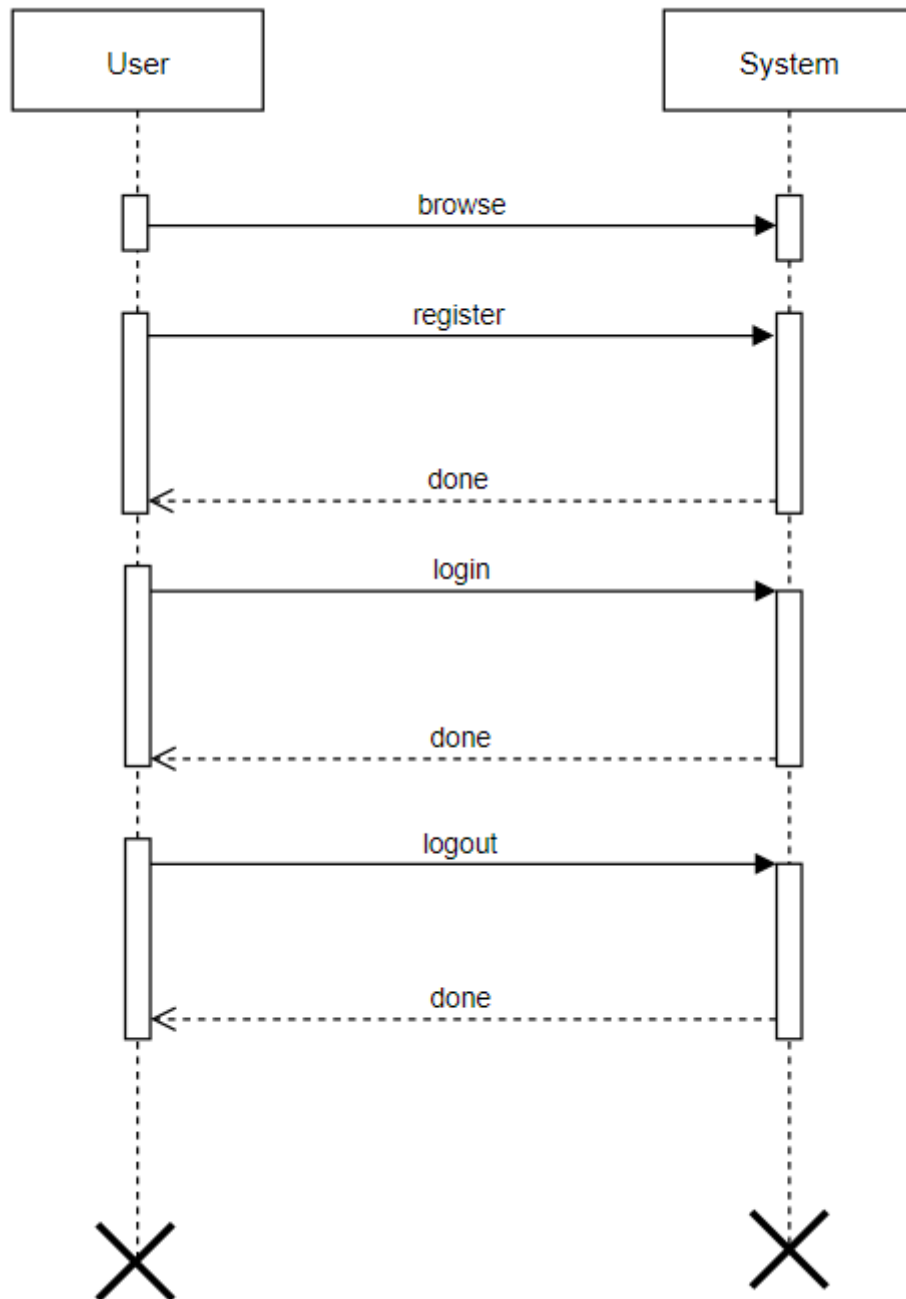
3.3 Use Case Diagram

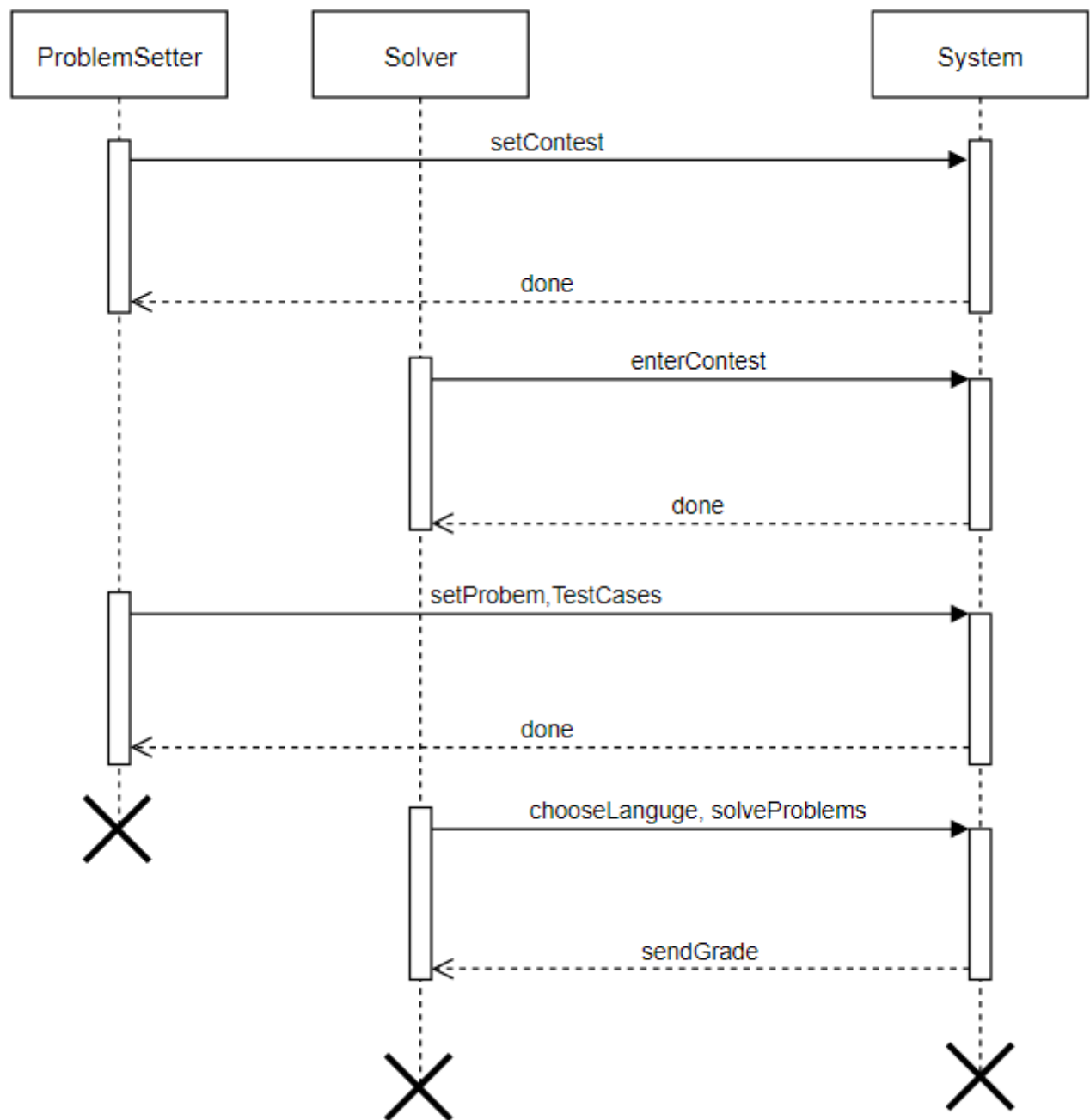


3.4 Database Diagram



3.5 Sequence Diagram





Chapter 4

Implementation

4 Implementation

4.1 Programming language (ASP.NET)

- ASP.NET is an open-source server-side web application framework designed for web development to produce dynamic web pages. It was developed by Microsoft to allow programmers to build dynamic web sites, web applications and web services.
- It was first released in January 2002 with version 1.0 of the .NET Framework, and is the successor to Microsoft's Active Server Pages (ASP) technology. ASP.NET is built on the Common Language Runtime (CLR), allowing programmers to write ASP.NET code using any supported .NET language. The ASP.NET SOAP extension framework allows ASP.NET components to process SOAP messages.
- ASP.NET's successor is ASP.NET Core. It is a re-implementation of ASP.NET as a modular web framework, together with other frameworks like Entity Framework. The new framework uses the new open-source .NET Compiler Platform (codename "Roslyn") and is cross platform. ASP.NET MVC, ASP.NET Web API, and ASP.NET Web Pages (a platform using only Razor pages) have merged into a unified MVC 6.



4.2 Methodology (MVC)

- The Model-View-Controller (MVC) is an architectural pattern that separates an application into three main logical components: the model, the view, and the controller. Each of these components are built to handle specific development aspects of an application. MVC is one of the most frequently used industry-standard web development framework to create scalable and extensible projects.

- **MVC Components**

- Following are the components of MVC – Model View Controller

- **Model**

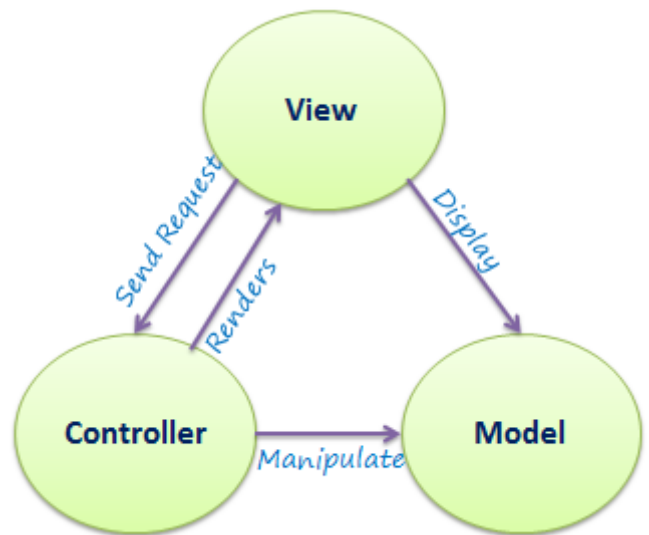
The Model component corresponds to all the data-related logic that the user works with. This can represent either the data that is being transferred between the View and Controller components or any other business logic-related data. For example, a Customer object will retrieve the customer information from the database, manipulate it and update it data back to the database or use it to render data.

- **View**

The View component is used for all the UI logic of the application. For example, the Customer view will include all the UI components such as text boxes, dropdowns, etc. that the final user interacts with.

- **Controller**

Controllers act as an interface between Model and View components to process all the business logic and incoming requests, manipulate data using the Model component and interact with the Views to render the final output. For example, the Customer controller will handle all the interactions and inputs from the Customer View and update the database using the Customer Model. The same controller will be used to view the Customer data.



4.3. Tools

- **Microsoft Visual Studio**



Microsoft Visual Studio is an integrated development environment (IDE) from Microsoft. It is used to develop computer programs for Microsoft Windows, as well as web sites, web apps, web services and mobile apps. Visual Studio uses Microsoft software development platforms such as Windows API, Windows Forms, Windows Presentation Foundation, Windows Store and Microsoft Silverlight. It can produce both native code and managed code.

- **Microsoft SQL Server**



Microsoft SQL Server is a relational database management system (RDBMS) developed by Microsoft. This product is built for the basic function of storing retrieving data as required by other applications. It can be run either on the same computer or on another across a network.

- **Kendo UI – Telerik**



Telerik Kendo UI Core is the free and open-source (Apache 2.0) version of Kendo UI. It includes nearly 80 percent of the UI widgets formerly in Kendo UI Web (Autocomplete, DatePicker, Tooltip, etc.), all of the widgets and features formerly available under Kendo UI Mobile, and all of the core framework features of Kendo UI (DataSource, SPA, MVVM, etc.).

4.4. Libraries

- **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.



- **jQuery**

jQuery is a cross-platform JavaScript library designed to simplify the client-side scripting of HTML. It is free, open-source software using the permissive MIT license.



Web analysis indicates that it is the most widely deployed JavaScript library by a large margin

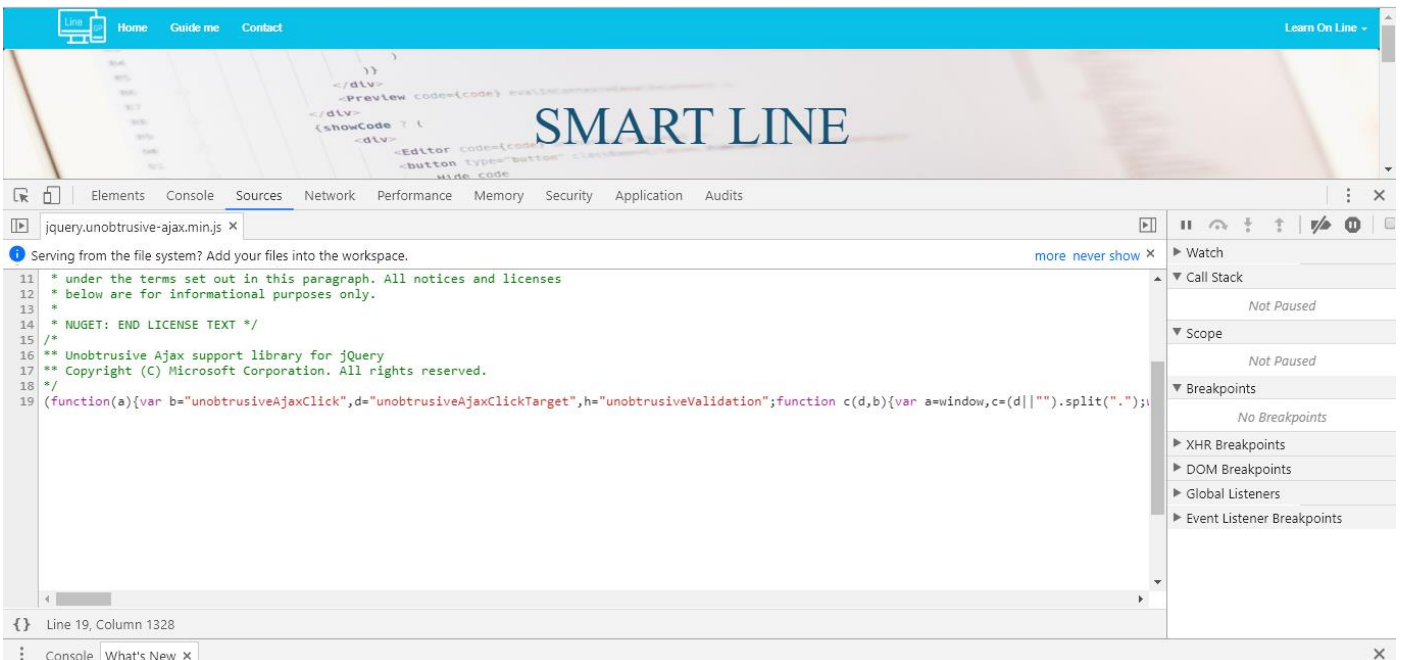
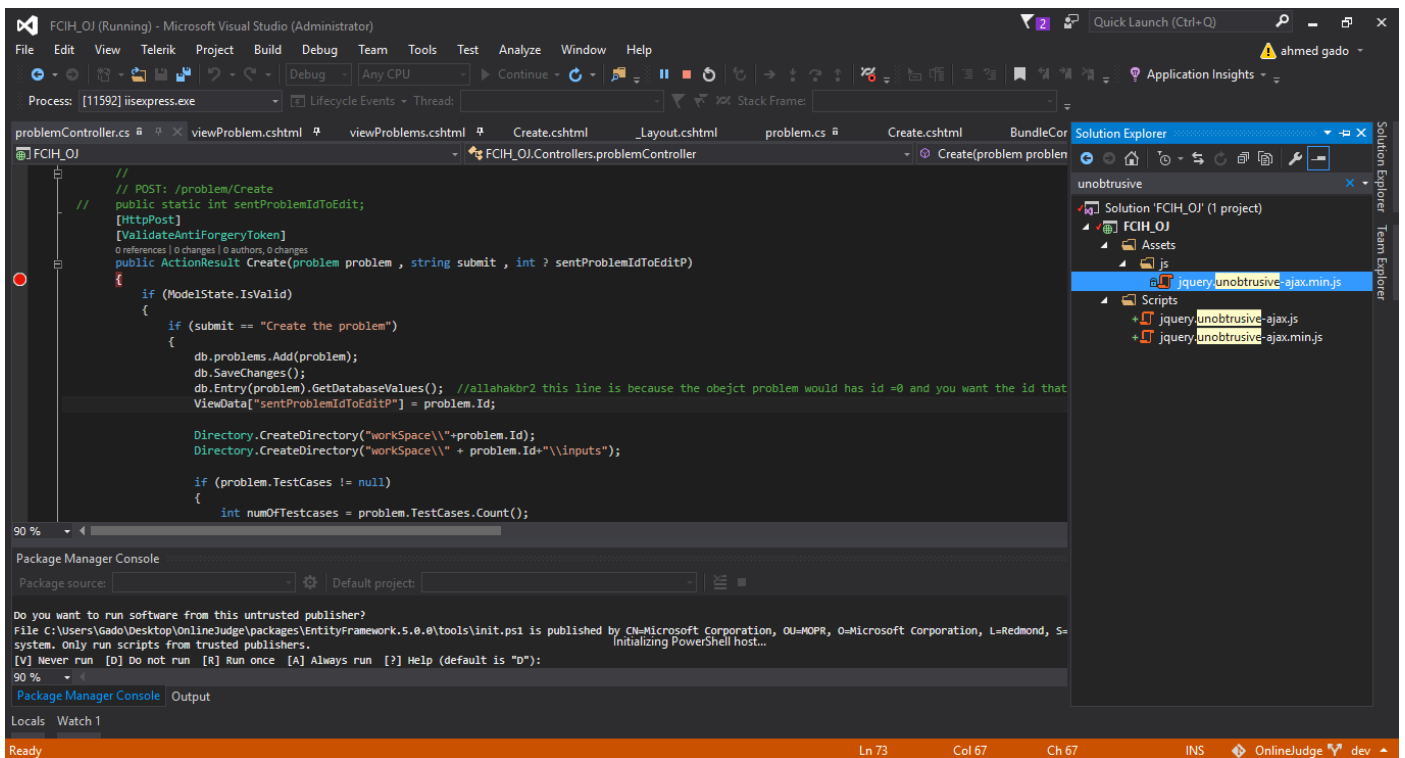
- **jQuery UI**

jQuery UI is a collection of GUI widgets, animated visual effects, and themes implemented with jQuery (a JavaScript library), Cascading Style Sheets, and HTML.

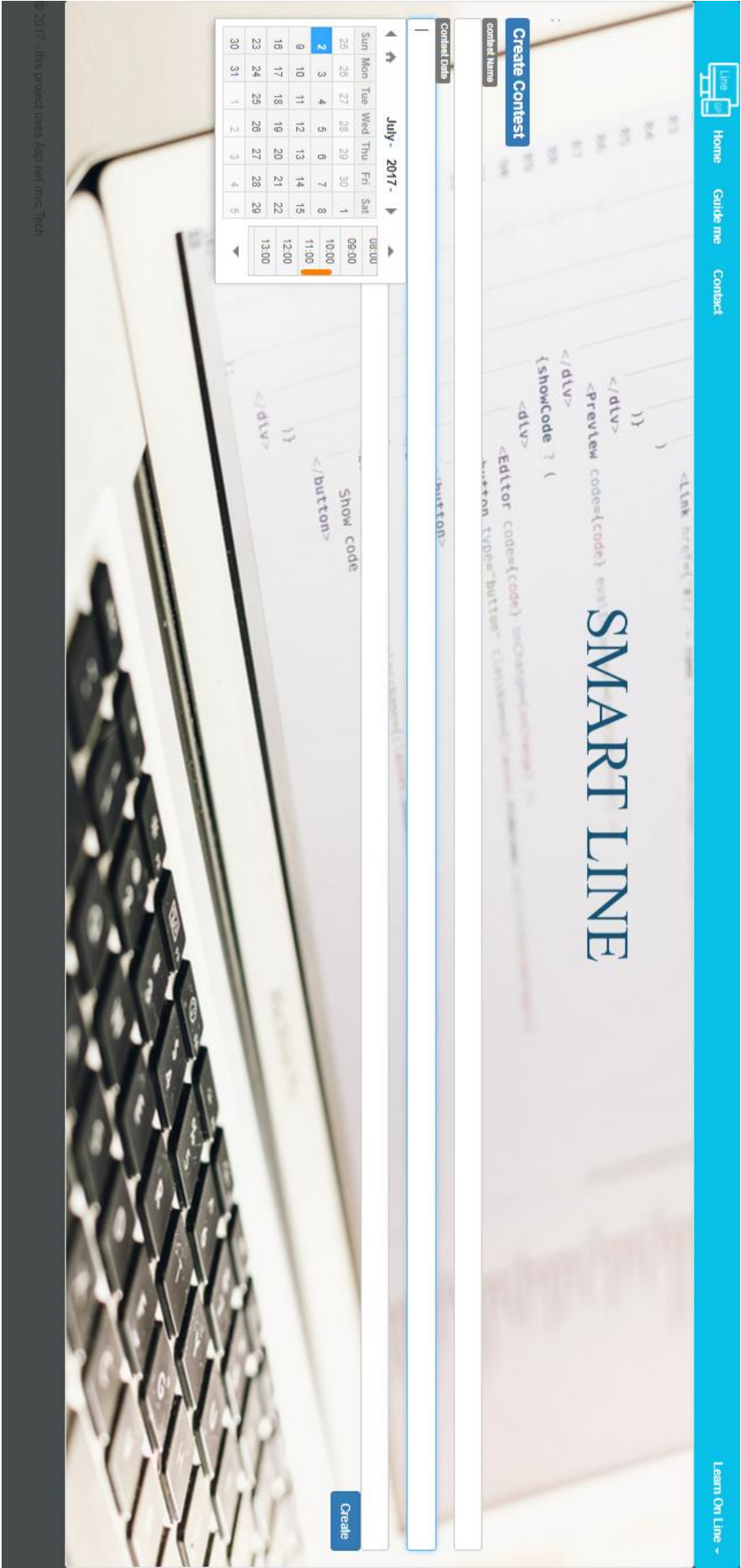


According to JavaScript analytics service, Libscore, jQuery UI is used on over 197,000 of the top one million websites, making it the second most popular JavaScript library.

4.5. Code sample



4.6. Screenshots





```
{showCode ? (
  <div>
    editor Code={code} onInputChange={onInputChange}
  </div>
  : null
)}
```

```
<div>
  <Editor code={code} onChange={onChange}
    className="editor" type="text" />
</div>
```

button?

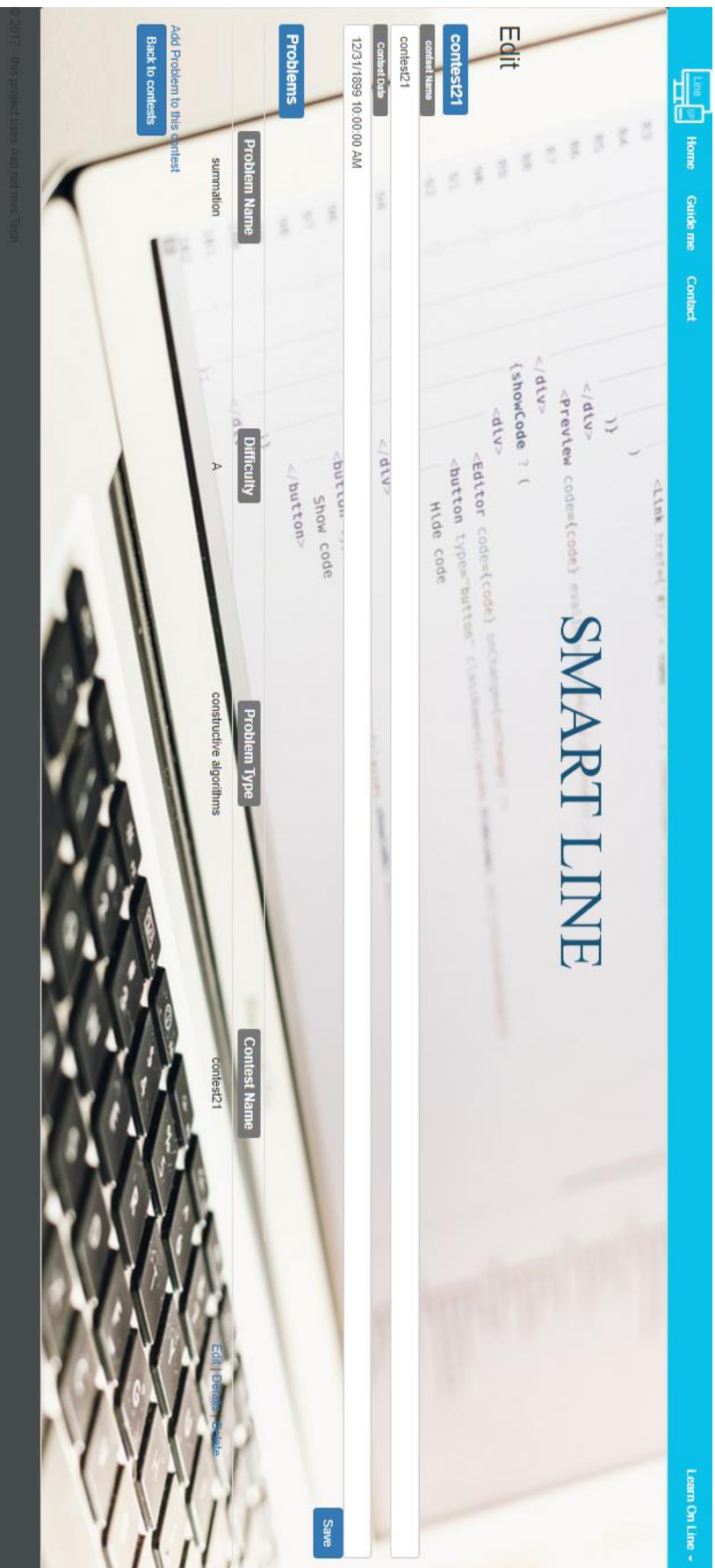
```
); (
<button type="button" class="button"
Show Code
```

</button>

Contests

contest Name

2017 - this project uses experimental methods



Line On

[Home](#) [Guide me](#) [Contact](#)

Learn On Line -

Create Problem

name

content

Problem Level

Select Problem Level ▾

Problem Type

Select Problem Type ▾

Number Of TestCases

Add TestCases

Back to List

SMART LINE

Hide code

Create the problem

© 2017 - this project uses Asp.net mvc Tech

Problem has created Successfully

Contact

Learn On Line

Create Problem

name

screens problem

content

screens problem

Problem Level

A

Problem Type

constructive algorithms

Number Of TestCases

2

Add TestCases

input1

1gao02

output1

3

input2

2gao02

output2

4

Create the problem

Back to List

SMART LINE

Log Out

Home

Guide me

Contact

Learn On Line

View Problems

Problem Name

Problem Name

Problem Name

Problem Name

Control

afterAdding kendo problem

kendo content

A

constructive algorithms

Solve

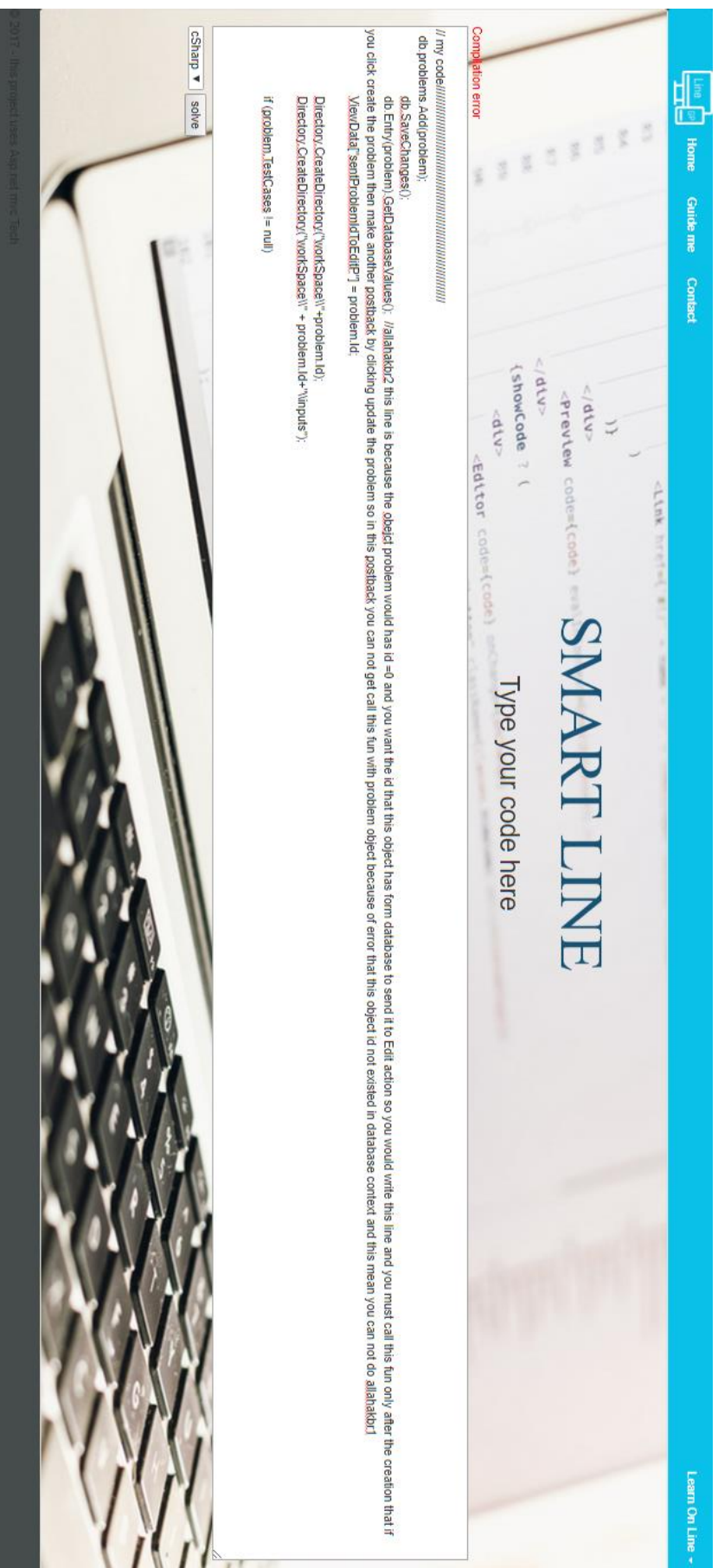
1

20

Items per page

1 - 1 of 1 items

2017 - the project uses AngularJS Tech



Chapter 5

Conclusion

and Future Work

5 Conclusion and Future Work

5.1 Conclusion

- Many people look for site for programming challenge and training like as new students want to learn and improve their knowledge in programming and solve problem and also the top programmer search for challenge case for take award or increase their knowledge every time.
- Many projects worked in this area, but be customized for Specific direction, which serve People with experience or are People have no experience like as new students, so we woke hard to make application to be in general serve both kind of user we have.
- And some of these projects worked on education direction to serve students, school and University, but it based on specific set of markers. Many people and school would like to set up or use their own site and page with their chart, report and personal data. For that, we build our SMOJ. A system that allow the school to create his own site reality scenario and can also define new pages or functions, these functions controlled by admin of system such as face detection and detect other pages user open on his browser to prevent fraud and copied code from other site to guarantee Improved intellectual user level in problem solving and learning can easily use SMOJ by providing simple user interface and follow up easy steps to create his scenario. Beside the presence for users who have programming background to add more features to the scenario.

5.2 Future Work

- The plan to the future It will not be limited to a particular direction but more of a trend but in the same direction of writing code and problem solving, we look for create a developer community as git hub or another community to publish papers of project to help coder or programmer in their similar project or to extend this project by other. Do hard work to improve the Performance level of system to be sure from users will not go out from our system.
- We have in phase of system the school entry and dealing with system as Independent system for it only without consideration for other services in the system.
- So, we work to attract Private schools to subscribe in system to spread the science of programming in large space we can.

- For their importance and desire many students to learn after they knew about it in many areas and the importance in the future, so we provide to them very good chance to learn without want another time but in their school and do more of education plans to help them grow fast with their level and this include a lot of laws will put some restrict help student and to be the school is sure of the results, the student level and its learning quality through the system we offer them. first a small software downloads on student PCs the mission of this software sends some data to the coach within student solve problem which put it the coach to student to training them as homework put through a specific time announced. the software will take photo to the student within he solves and send to system to detected his face and verify his identity because he can make any one to solve to himself when system get student identity not true send alert with his information as id, name and class to send alert email to the student by press on special button by this operation.
- Second mission to this software check that no other browser or pages are opened on the same browser to ensure that the student does not cheat or copy the code from any site that publishes problem solutions by these two ways we make sure that user solution will from his think and his effort.

Glossary

6 Glossary

Terminology	Definition
Class Diagram	A class diagram in the Unified Modeling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among objects.
Sequence Diagram	A sequence diagram shows object interactions arranged in time sequence. It depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario. Sequence diagrams are typically associated with use case realizations in the Logical View of the system under development. Sequence diagrams are sometimes called event diagrams or event scenarios.
Use Case Diagram	A use case diagram at its simplest is a representation of a user's interaction with the system that shows the relationship between the user and the different use cases in which the user is involved. A use case diagram can identify the different types of users of a system and the different use cases and will often be accompanied by other types of diagrams as well.
Functional Requirements	The main things that the user expects from the software for example if the application is a banking application that application should be able to create a new account, update the account, delete an account, etc. functional requirements are detailed and are specified in the system design.
Non-Functional Requirements	Are not straight forward requirement of the system rather it is related to usability (in some way) for example for an banking application a major non-functional requirement will be availability the application should be available 24/7 with no down time if possible.

GUI	Graphical User Interface (GUI) is a type of user interface that allows users to interact with electronic devices through graphical icons and visual indicators such as secondary notation, instead of text-based user interfaces, typed command labels or text navigation. GUIs were introduced in reaction to the perceived steep learning curve of Command-Line Interfaces (CLIs) which require commands to be typed on a computer keyboard.
ROM	Read-Only Memory (ROM) is a type of non-volatile memory used in computers and other electronic devices. Data stored in ROM can only be modified slowly, with difficulty, or not at all, so it is mainly used to store firmware (software that is closely tied to specific hardware, and unlikely to need frequent updates) or application software in plug-in cartridges.
SRS	Software Requirements Specification (SRS) is a description of a software system to be developed. It lays out functional and non-functional requirements, and may include a set of use cases that describe user interactions that the software must provide.
SDD	Software Design Document (SDD) is a written description of a software product, that a software designer writes in order to give a software development team overall guidance to the architecture of the software project. An SDD usually accompanies an architecture diagram with pointers to detailed feature specifications of smaller pieces of the design. Practically, the description is required to coordinate a large team under a single vision, needs to be a stable reference, and outline all parts of the software and how they will work.

References

7 References

- https://en.wikipedia.org/wiki/Online_judge
- <https://www.urionlinejudge.com.br/judge/en/login>
- <http://codeforces.com/>
- <https://uva.onlinejudge.org/>
- <https://a2oj.com/>
- <https://elearningindustry.com/4-benefits-learning-programming-at-a-young-age-2>
- <https://careerfoundry.com/en/blog/web-development/7-benefits-of-learning-to-code/>
- <http://www.codeconquest.com/what-is-coding/benefits/>
- <https://www.collegeamerica.edu/blog/the-benefits-of-learning-computer-programming>
- <https://www.quora.com/What-is-the-purpose-of-computer-programming>
- https://en.wikipedia.org/wiki/Sequence_diagram
- https://en.wikipedia.org/wiki/Use_case_diagram
- https://en.wikipedia.org/wiki/Class_diagram
- https://en.wikipedia.org/wiki/Functional_requirement
- <https://stackoverflow.com/questions/16475979/what-is-functional-and-non-functional-requirement>
- https://en.wikipedia.org/wiki/Graphical_user_interface
- https://en.wikipedia.org/wiki/Read-only_memory
- https://en.wikipedia.org/wiki/Software_requirements_specification
- <https://en.wikipedia.org/wiki/SDD>
- https://en.wikipedia.org/wiki/Software_design_description
- <https://www.asp.net/>
- <https://en.wikipedia.org/wiki/ASP.NET>
- https://www.tutorialspoint.com/mvc_framework/index.htm
- <https://www.tutorialspoint.com//asp.net/index.htm>
- <https://www.visualstudio.com/>
- https://en.wikipedia.org/wiki/Microsoft_Visual_Studio
- <https://www.microsoft.com/en-us/sql-server/sql-server-2016>
- https://www.tutorialspoint.com/ms_sql_server/
- <http://www.telerik.com/kendo-ui>
- <http://getbootstrap.com/>

- <https://www.w3schools.com/bootstrap/>
- [https://en.wikipedia.org/wiki/Bootstrap_\(front-end_framework\)](https://en.wikipedia.org/wiki/Bootstrap_(front-end_framework))
- <https://jquery.com/>
- <https://en.wikipedia.org/wiki/JQuery>
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- https://en.wikipedia.org/wiki/JQuery_UI