



MIDDLE EAST TECHNICAL UNIVERSITY



DEPARTMENT OF COMPUTER ENGINEERING

CENG 491 - SENIOR PROJECT

REQUIREMENT ANALYSIS REPORT

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1. INTRODUCTION

This document is requirement analysis report of our Project namely **Isteis**. In the first part of the document, we gave detailed Project definition and scope. Also we explained our goals and objectives. The next section is about the process model and our team structure on this Project. After this you can find information about research we have done before starting to Project till today. On this section we have examined existing systems like our Project and the technologies that we plan to use through out our Project. Then comes the requirement analysis, we have discussed our system and user requirements in this part. Also we have showed our data objects, data flow diagrams, data dictionary and use case analysis on system analysis and modelling section. Lastly, we have put our Project Schedule and time and effort estimation model on related parts.

1.1 Background

Today, internet is in every part of our lifes. Every one of us without distinction of age , sex etc. uses internet extensively. Due to this technological improvement, traditional ways of doing many things have changed and are still changing. These days, we do shopping, pay our bills on the internet, make reservations, take tickets, even get educational degrees online. Web services and applications make most of these possible.

Web service is a software system designed to support interoperable Machine to Machine interaction over a network. Web services are frequently just Web APIs that can be accessed over a network, such as the Internet, and executed on a remote system hosting the requested services.¹ In recent years, web technology has made a big progress and web services has started to been used in many different styles. Most popular one of these styles today is Service Oriented Architecture (SOA).

SOA is an architectural style for building software applications that use services available in a network such as the web. SOA enables businesses to leverage existing investments by allowing them to reuse existing applications, and provides interoperability between different applications and technologies.² Service-oriented architecture is a hot topic

¹ Wikipedia, http://en.wikipedia.org/wiki/Web_service

² Sun Developer Network, <http://java.sun.com/developer/technicalArticles/WebServices/soa/>

in enterprise computing. Because especially a web services – based SOA has the potential of dramatically speeding up the application development process. It is also a way to build applications and systems that are more adaptable then systems become more agile in responding to changing business needs. SOA is clearly the wave of the future.

We will build an online portal using web services – based Service Oriented Architecture. SoftwareAG which is one of the leader companies in SOA solutions is our supporting company in this Project.

1.2 Project Definition

Our project is a gateway portal where we will be able to get together both job seekers and job providers in cooperation with career web pages. Essentially, our Project will act as traffic driver to those career web sites. So, we must consider the services that we provide for our users on our portal in two different categories. There will be services for job seekers and similar or different services for job providers, employer companies. Moreover, in the name of cooperation, we will need some services coming from career web pages and also provide some services for them.

Our portal will run on a membership system. At first, both job seekers and providers have to have an account to use our portal. And we are not planning to charge any fees from job seeker users while job providers need to pay a little membership fee to get an account on our portal.

The services that we will offer for job providers can be listed as:

- **Payment Module:**

We need this module for both taking the membership fees from job provider users to have an account on our portal and transferring the mambership fees of chosen career web pages by employer companies to work with and publish their job offers. The most significant point of this module will be security issues on this money transfers. We will work on building a very secure module.

- **Publish Site Selection Module:**

This module allows our job provider users to select on which cooperate career web sites they publish their job offers. To help employer companies on their choice we will have a section where we compare these carer pages on different categories such as; membership fees, extra services they provide, the statistics of their preference by job seekers, numbers of positioned job seekers to published offers on their web sites. And then we will grade each career web site on these categories. We think this service helps job providers and decreases the time spent on this decision.

- **Employee Search Module:**

By this module job providers can search employee having the properties that they want on different categories through the job seeker information pools of the cooperate career web pages on which they have a membership.

- **Information Module:**

Our member employer companies will be informed of any change or improvement made on our portal or career web sites services. Also, they can see if there is any application to their published job offers and who did these applications. Moreover, this module will inform job provider users about their membership statuses of both our portal and cooperate career web pages.

The services that we will provide for job seekers can be categorized as:

- **Job Search Module:**

By this module job seekers can search job offers on our portal, and see all resulting offers with the related search tags gathered from all career web sites that we are working with. They can see the published offer as it is given to the career web site with the reference of the subjected career web page.

- **Job Application Module:**

This module allows Job seekers leave their Cvs in the forms word or pdf documents, videos or the standard form that we provide for them. We will be sending all these information to each career web site that we will be working with. Applications to the jobs that they choose will be made according to related career web sites' ways which is proceeded as it is on our portal.

- **Information Module:**

We will inform our job seeking members with offers made to them and new job offers published on any career site that is in cooperation with our portal. We will also planning to show job seekers different job opportunities from those that they are looking for according to their skills, experience. Moreover, most popular and preferable jobs, positions and companies will be listed on our portal. Their application status will also be sent by e-mail to them.

- **Feedback Module:**

This module will get into action after positioning of any job seeker occurs. We will send polls to job seekers to get the feedback of the process. These polls will contain quesions about our portal considering such as the ease of use, any lacking properties or services. The referring career web site will also be questioned about their services, etc.

According to all above we need services from career web sites and we provide some for them. We will be helping both job seekers and offerers and refer them to these web pages. We will need to know how the process goes after this referring. If any positioning occurs, we should be informed. We need this data to update statistics of the career sites that we provide for employers and also we will use this data to stop or continue to make alternative job offers to related job seeker. We will also be informing them with the results of polls we made to job seekers to help them to consider their services, etc.

1.3 Project Goals and Scope

Our goal in this Project is to develop a portal which makes job and employee finding processes much more easy and less time consuming. Our portal will prevent job seekers to search all career web pages and do the same create an account, upload a CV, search job

offers, apply to job procedure. Also it will simplify finding a career we site to publish offers or searching employee processes for job providers.

Besides, on doing this Project we have goals like;

- building a web based service oriented architecture
- bringing a complete web portal at the end of 7 months.
- creating a portal which is interactive, easy to use, efficient and visually attractive.

The scope of this Project is providing a methodology and guideline to build a gateway portal integrating many services from different sides. Because this integration idea can be used in many applications in many different sectors. This Project will help developers in;

- Proposal of a web – based Project,
- Analysis and documentation of current gateway portal applications,
- Specification of a detailed user, system and developer requirements,
- Design of an appropriate system having necessary properties,
- Implementation of Service Oriented Architecture and Web Services on Project.

2. THE PROCESS

2.1 The Process Model

In the nature of our Project, we have to proceed step by step because there are fixed milestones that we have to consider. These tight milestones made us choose a sequential software development model. However, how well we defined the requirements and phases of our Project, there is always a possibility to make mistakes or confront any unexpected situation during the phases of our Project, then we need to step back some phase or phases and do the required changes. We need a feedback mechanism to achieve these stepping backs during the Project so we decided our process model to be waterfall model with feedback.

2.2 Team Structure

We have decided our team structure as a Democratic Decentralized. We think that this structure works best for our Project and team because we are a small team and every member of our team is equally competent in general. Our Project topic is new to every one of us so every decision throughout the Project will be needed to be made by consensus.

3. RESEARCH

3.1. Market Observation

In late 90's there occurred a demand for online job search and applications. In local market first newspapers carried the job ads to the world wide web. Then different human resources and career consulting firms implemented sites where job seekers and providers met.

By Summer 2006 two bigger private career sites had a total number of CV's over 5 million. And number of total member companies was over 28.000. In accordance with the action plan of State Planning Organization about e-Transformation Project Turkey, public institutions also needed to build websites.

This offer in human resources business led a demand for a portal combining all these job advertisements in one platform. A few amount of portals were created for this purpose. But these portals turned out to be "Career Google"s where users are redirected to several sites with different layouts etc. And they can not offer a platform for the job seeker and the job provider that they can personalize.

3.2. Existing System Analysis

There are not many web pages or portals on the internet which provides all the services that we will be providing for both job seekers and job providers. Here, we are going to introduce and interpret their services.

Here is three Turkish web pages that provides job searching results gathered from many different career web pages.

- www.inonto.com

Inonto.com searches through the popular Turkish career web pages such as www.kariyer.net , www.yenibiris.com , www.secretcv.com and gathers job offers being published on them. Inonto.com shows only gathered job offers dating back to two months being published on these career web sites. But there is also a bug here, it does not have a filter mechanism to clean up the offers whose due dates have passed so it stil continues to show these old job offers.

This web page has a membership system. The job search can be made according to keywords and cities. The resulting job offers are listed in position title, company, city, and date attributes. The ordering of the offers is made due to their publish dates. When you click any of the resulting offers, you see the text of offer and the source career web page that the result comes from. Also, every offer in the list has a button namely 'Hemen Basvur' next to it. If you push this button, you are guided to the offer's actual page on the source career web page. At this step if you do not have a membership on this career page, you have to create an account and move on to next step, if you already have an account, you have to enter your user id and password to enter the system and proceed. After you are logged on to the source career page, you can do applications or etc. according to these web pages principles.

- www.isbuluyorum.com

There is no membership system on isbuluyorum.com. This web page can show job position offers coming from many local career web pages. Isbuluyorum.com has a more wide source of career web sites relative to inonto.com. www.kariyer.net , www.secretcv.com, www.yenibiris.com, www.trkriyer.com, www.mulakat.net, www.elemanonline.com, www.kariyerseri.net , www.turizmcv.com, www.saglikcv.com are some of those sources.

Isbuluyorum.com has a simple user interface. There is only a search module where you can search job offers based on keywords and locations. The resulting job offers of searching process is listed according to their rates which are given by job seekers. The listing form consists job title, company name, city, publish date and given rate. When you click on the job title link, you see the job offer's publish text which contains reference of source career web page besides all attributes on listing form. On this new page there is also two buttons, one for application and the other for seeing detailed information about job offer owning company. If you click on the application button, you are referred to actual page of the offer on source career site. To complete application process you have to have an account on this source page. If you do not, you have to create otherwise you must log on to system. After this step, application can be made by following source career web pages principles.

Isbuluyorumm.com has also some extra services. Job seekers can see the searches that they have done so far by clicking the 'Aramalarım' link. The 'Şirketler' link lists all the companies whose offers can be reached through isbuluyorum.com. On the web page that our job offer search results can be seen there are three more links namely 'Eğilim' that shows graphically the number of job offers can be reached through isbuluyorm.com in time , 'İlişkisel Arama' which makes search easy by combining two or more search criteria. RSS service is also provided for users on this web page.

- www.isarayan.org

Isarayan.org is working very differently from the above two web pages. This web site has just a search module where filtering occurs by keywords. The results keyword matching job search results from google. This web page's search module do the google search on given keywords and lists the google web site results. To see the offers you have to click on the web page link as in google search and enter to the source career web page system. And then proceed by getting an account for that source page and complete the search and apply job according this web pages criteria.

The last two web pages are also giving nearly the same services like the ones above but these web pages gather job offers mostly from Usa.

- www.simplyhired.com

Simplyhired.com has a simple user interface like the ones above. In the search module on main page, you can search job offers related to keywords and location. But this web page has relatively improved advanced search option. On this section you can filter job offers on job type such as; full-time, part-time, permanent, temporary, internship, seasonal, voluntary, or work experince, publish date and salary info. Moreover, there are filtering options about company like company size based on number of employees, company revenue, and special filters like Fortune 100 fastest growing companies, Forbes 25 fastest growing tech compnies, age 50+ companies etc. The results of these searches are listed with some text from the job offers publishment text and a reference to the source web page. The listing can be made according to date or relevance. When you click on the job offers title on the list, you are guided to actual web page of the offer on the source web site. To go further from here, you have to

have an account on this page and remaining steps can be completed by this source web site's criteria.

Users can save their searches or job offers that they interested in by creating an account on the web page. The expired offers included in this save action can also be eliminated. By this account they can also set up job alerts to come their e-mails or they can build resumes by resume builder on the web page and send this document to five major job boards in Usa. They can also choose between these boards. There is also a system which allows job seekers to grade job offers and list the results of their searches according to rates of the offers. RSS service is also provided by simplyhired.com.

- www.careerjet.com

This web page is also has a simple user interface which is formed of just a search module and job categorizations. On this search module you can do keywords and location based searches. In advanced search module of the web page, the filtering criteria is extended with position title, job sector and company name. The results of these searches can be listed according to publish dates, degree of keywords matching and salaries. Job offers listed in the form on which some part of the description can be seen and the source of job offer is also referenced.

There is also other services that careerjet.com provide for its members only. All members have an account on the system and they can change or update their account information by entering the profile section. They can also see the searches that they have done so far. It is also possible to save any job offer that you interested in. Also the web site have an alert system that informs you through e-mail weekly or monthly about job offers in the area that you are looking for. Job seekers also create CVs or cover letters by filling in standard template forms of careerjet.com. These documents are sent to employers if any need occurs. There is also an RSS system on web site.

3.3. Literature Survey

Before starting our Project and being aware of that all of us is inexperienced in web based applications and Service Oriented Architecture is totally a new concept to all team, we have done some research on these topics. After detailed searches on the internet, we found many online sources and we carefully examined these sources, then Web Services and Soa concepts are understood by all team members.

During the Project we will be dealing with Technologies like AJAX, XML Databases. AJAX stands for Asynchronous JavaScript And XML. This technology provides the system to transfer require data asynchronously between the browser and the web server. The browser needs to request only small bits of information from the server.³ One of the effective issues related to AJAX Technology is that it can work together with different kinds of format files such as XML, HTML and even text files. Furthermore, the main characteristic of the AJAX technology is its “asynchronous” nature. AJAX provides all the tasks can be done without refreshing the web page. This nature can provide our project to be more compact and faster.

XML stands for the Extensible Markup Language. XML is used to design to store data, carry data and exchange data.⁴ XML is hardware and software independent so XML formatted data can be shared between different application on different platforms. In our Project we might need to access different databases in distinct formats so by the help of XML technology it will be easy to manage those data for us.

Our Project will be developing our Project in Java. Our team has some experience in Java Development. If we need any assistance on Java, we will be using internet sources for help. While SOA and Web Services are new concepts for us, we chose the book named **“Web Services Platform Architecture: SOAP, WSDL, WS-Policy, WS-Addressing, WS-BPEL, WS-Reliable Messaging, and More”** (by Sanjiva Weerawarana, Francisco Curbera, Frank Leymann, Tony Storey, Donald F. Ferguson, Prentice Hall, 2005) as our guidance on these subjects throughout the Project.

³ Mozilla Developer Center, http://developer.mozilla.org/en/docs/AJAX:Getting_Started

⁴ Wikipedia , <http://en.wikipedia.org/wiki/Xml>

4. PROJECT REQUIREMENTS

4.1. Functional Requirements

Signing up, composing profile and searching job/employee functionalities will be performed for both job seekers and job providers. Already signed up users will be able to do functions such as logging in, and updating profile.

Uploading CV, updating the CV which is already left, filling in the CV form which exists in our portal (it can be done while signing up), and filling in survey functions are provided for logged on job seekers.

Signing up is required for job providers to do operations. They have to make a small payment to become a member. After logging in they can choose one or more career web sites, which works with our portal under agreement, to join. Below these functions are listed briefly:

Job Seeker:

- Sign up
- Log in and see profile, update profile
- Leave a CV in doc, standard form or video formats
- Search for job offers
- Apply a job
- Do the polls

Job Provider:

- Sign up and pay the membership fee
- Log in, profile: see, update
- Choose a career web site and become a member
- Leave job offers to be published on career pages on which having a membership
- Search job seekers for an empty position
- Contact job seeker that found appropriate

See also the use cases and project description sections for more detailed information.

4.2. Non-Functional Requirements

Usability:

Our web site should be user-friendly; clear, sightly, and not subsuming useless structures. If a visitor encounters pages, links, animations and popups much more than adequate it will create a bad impression, which is undesirable. Also the pages and menus should be designed well. Priority functions like login, sign up, and search should be more striking to obtain the user-friendliness and clearness.

Interoperability and Portability:

Service Oriented Architecture and Web Services are going to be used to develop our portal. Since interoperablity and portablity are the major characteristics of SOA and Web Services, our portal will share these fetures too. It is going to be platform independent so that internet connection is sufficient to access our portal.

Reliability:

Reliability and security are the major requirements for our project. Because there will be many user operations which involve privacy. For instance, money transfer operations will be done by the job providers, which requires great secure. Furthermore, job seekers will leave their curriculum vitaes, which include personal information. Extraneous people shouldn't be able to reach, use and change them.

Consistency:

Our portal should be able to manage invalid user inputs or inconsistent conditions. It provides error checking to ensure the right input format and returns errors and warnings to the user.

4.3. System Requirements

4.3.1. Hardware Requirements

We are going to develop our portal with the tools provided for us by SoftwareAG. These tools have some requirements to use:

Client:

- PC: 1 GHz or higher, 512 MB main memory for comfort usage or corresponding UNIX workstation
- TCP/IP connection

Server/Development Work Station:

- PC with one Intel Pentium processor, 1GHz or better, 512 MB main memory or more, approximately. 40 GB available memory on hard disk or corresponding Unix workstation
- TCP/IP connection

4.3.2. Software Requirements

Client:

- Internet Explorer Version 5.5 or higher, Mozilla Firefox Version 1.0 or higher, Netscape Version 7.2 or higher

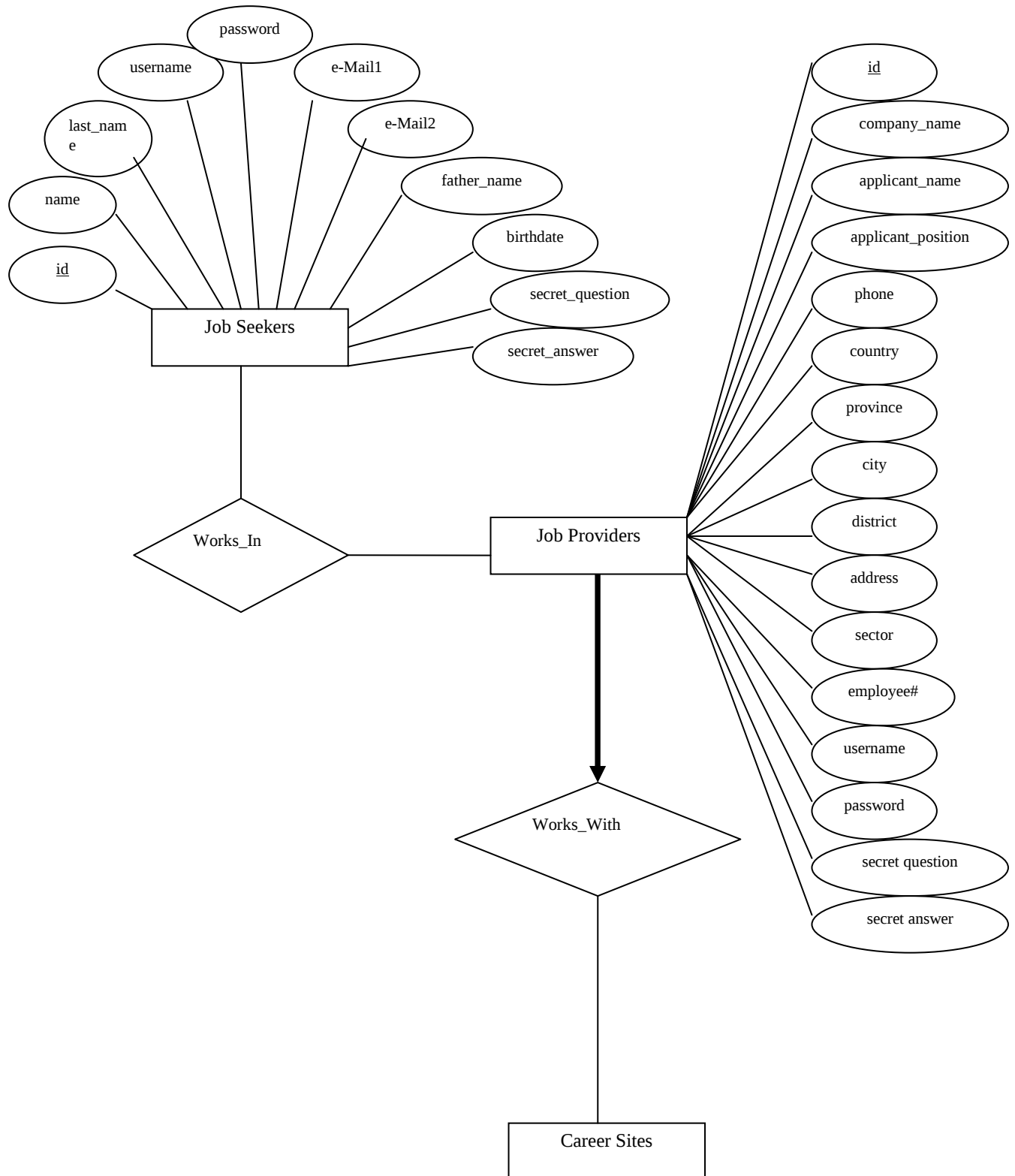
Server/Development Work Station:

- Windows 2000 Professional, Server, and Advanced Server, Windows Server 2003 Standard Edition and Enterprise Edition, Windows XP Professional
- HP-UX 11.11 and 11.23 for PA-RISC (64 bit), HP-UX 11.23 for Itanium2 (64 bit)
- SuSE Enterprise Server 9 for x86, Red Hat Enterprise Linux 3 and 4 for x86, Solaris 9 and 10 for Sparc (64 bit)
- SoftwareAG tools
 - o Service Orchestrator
 - o Active BPEL
 - o Application Designer
 - o Tamino
 - o BPM
- JDK(JRE & Java SDK), Apache/Tomcat
- Application Development Environment (Eclipse, NetBeans, Microsoft Visual Studio .NET ...)
- ODBC/JDBC compliant database (Oracle, SQL Server, Adabas...)

5. SYSTEM ANALYSIS AND MODELLING

5.1. Functional Modelling

5.1.1 Data Objects Description - ER Diagram



Career Site

ID#	Site Name	Select Sentence Prototype
-----	-----------	------------------------------

Job Seeker

ID#	Name	Last Name	Username	Password	e- Mail 1	e- Mail 2	Father's Name	Birth date	Secret Question	Secret Answer
-----	------	--------------	----------	----------	-----------------	-----------------	------------------	---------------	--------------------	------------------

Employer ID#

Job Provider

ID#	Career Site ID#	Company Name	Applicant's Full Name	Applicant's Position	Phone#	Country	Province	City	District
-----	-----------------------	-----------------	--------------------------	-------------------------	--------	---------	----------	------	----------

Address	Sector	Employee#	Username	Password	Secret Question	Secret Answer
---------	--------	-----------	----------	----------	--------------------	------------------

CV

Personal Information

Seeker ID#	Gender	Phone#	Mobile Phone#	TC Identity #	Military Service Status	Marital Status	Country	Province	District
---------------	--------	--------	------------------	---------------------	-------------------------------	-------------------	---------	----------	----------

Educational Information

Seeker ID#	Education Level	Status	Graduation Date	Department	School
------------	--------------------	--------	--------------------	------------	--------

Work Experience Information

Seeker ID#	Company Name	Business Sector	Work Area	City/Country	Date Interval
------------	-----------------	--------------------	-----------	--------------	---------------

Language Information

Seeker ID#	Language Name	Reading Level	Writing Level	Speaking Level	Place Learned
------------	---------------	---------------	---------------	----------------	---------------

Computer Programs

Seeker ID#	Program Name	Knowledge Level
------------	--------------	-----------------

Programming Languages

Seeker ID#	Language Name	Knowledge Level
------------	---------------	-----------------

Operating / Network Systems

Seeker ID#	System Name	Knowledge Level
------------	-------------	-----------------

Databases

Seeker ID#	DBMS Name	Knowledge Level
------------	-----------	-----------------

Institutional Software

Seeker ID#	Software Name	Knowledge Level
------------	---------------	-----------------

Office Utilities

Seeker ID#	Utility Name
------------	--------------

Certificate Information

Seeker ID#	Certificate Name	Date	Institution
------------	------------------	------	-------------

Seminar Information

Seeker ID#	Seminar Name	Institution	Duration	Date
------------	--------------	-------------	----------	------

Examinations

Seeker ID#	Examination Name	Examination Grade	Institution	Date
------------	------------------	-------------------	-------------	------

References

Seeker ID#	Reference's Name	Reference's Last Name	Company	Position	Phone	e-Mail	Reference Type
------------	------------------	-----------------------	---------	----------	-------	--------	----------------

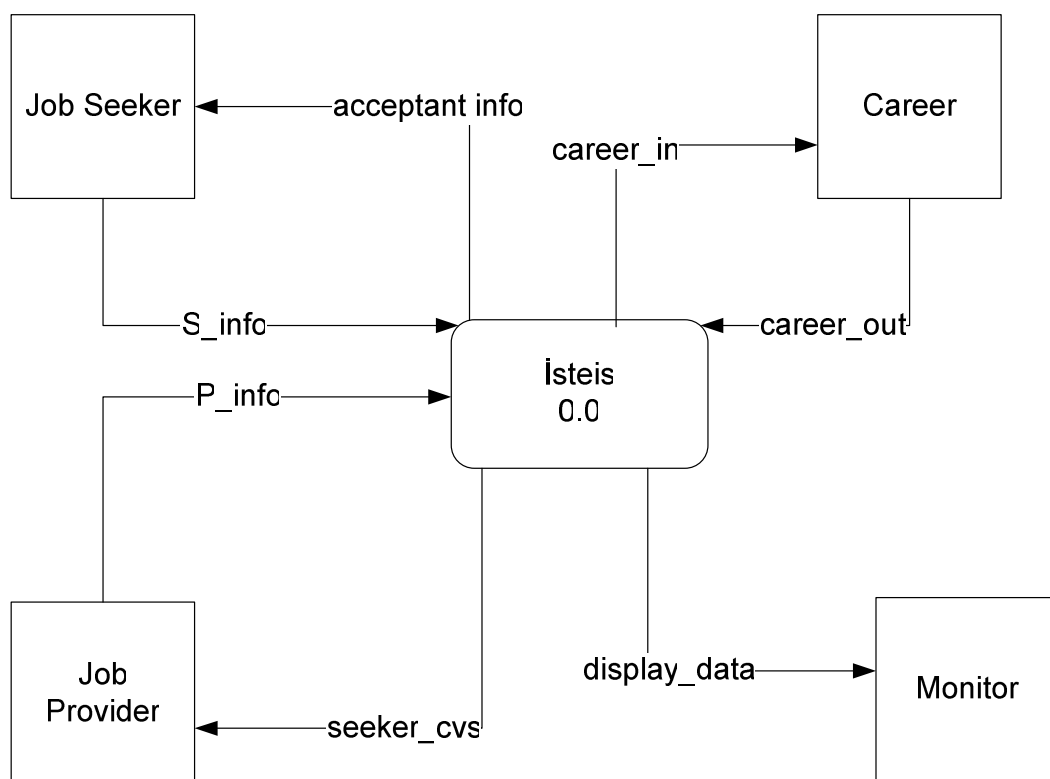
Job Offer

Provider ID#	Position	Work Definition	Necessary Qualifications	Work Area	Work Type	City	Country	Announcement Date
--------------	----------	-----------------	--------------------------	-----------	-----------	------	---------	-------------------

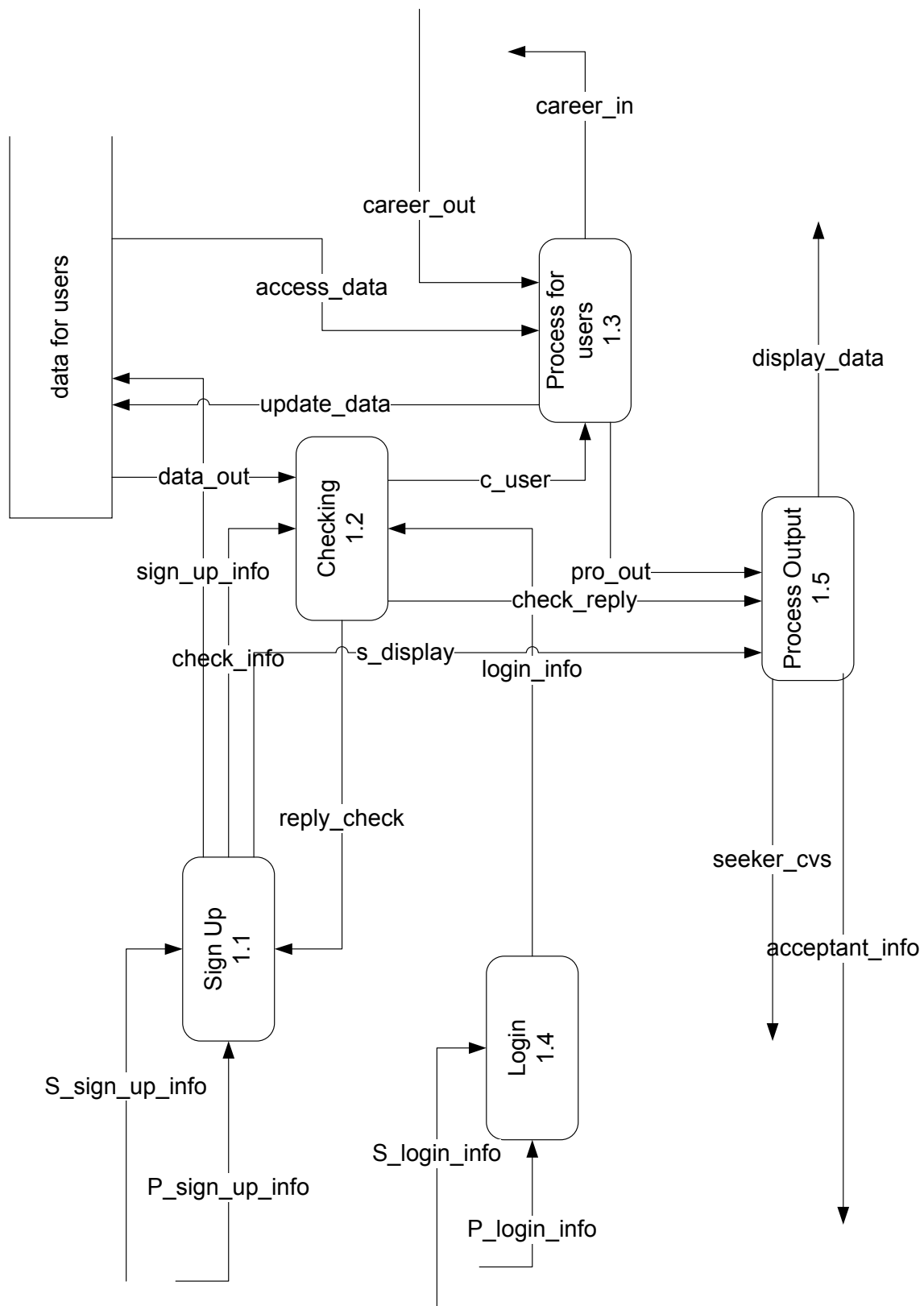
Last Application Date

5.1.2 Data Flow Diagrams

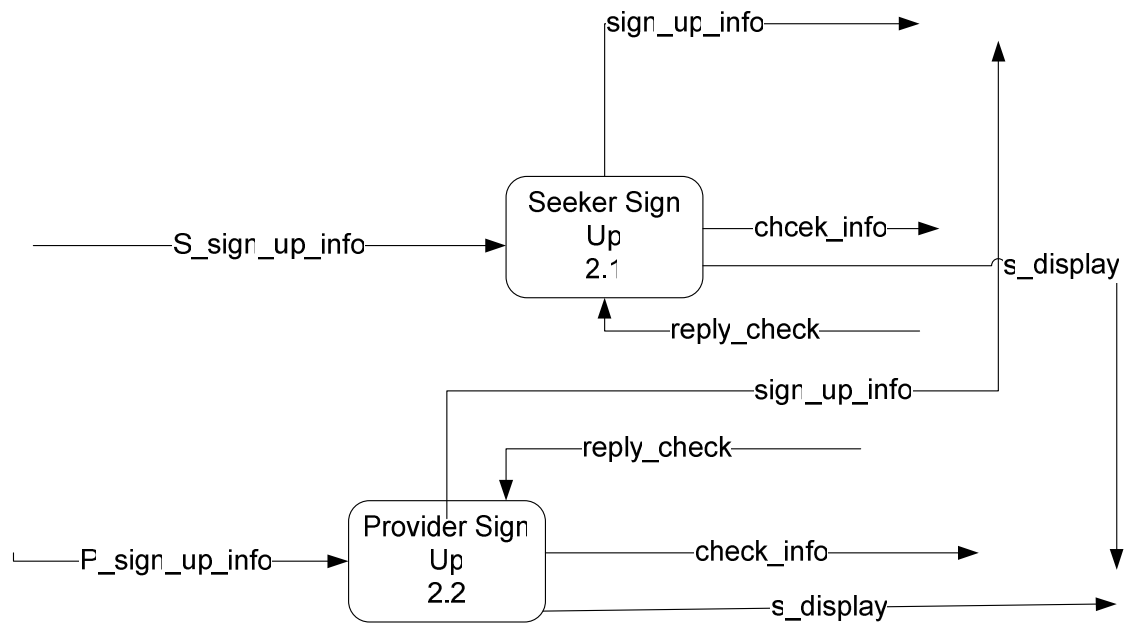
a. DFD: Level 0



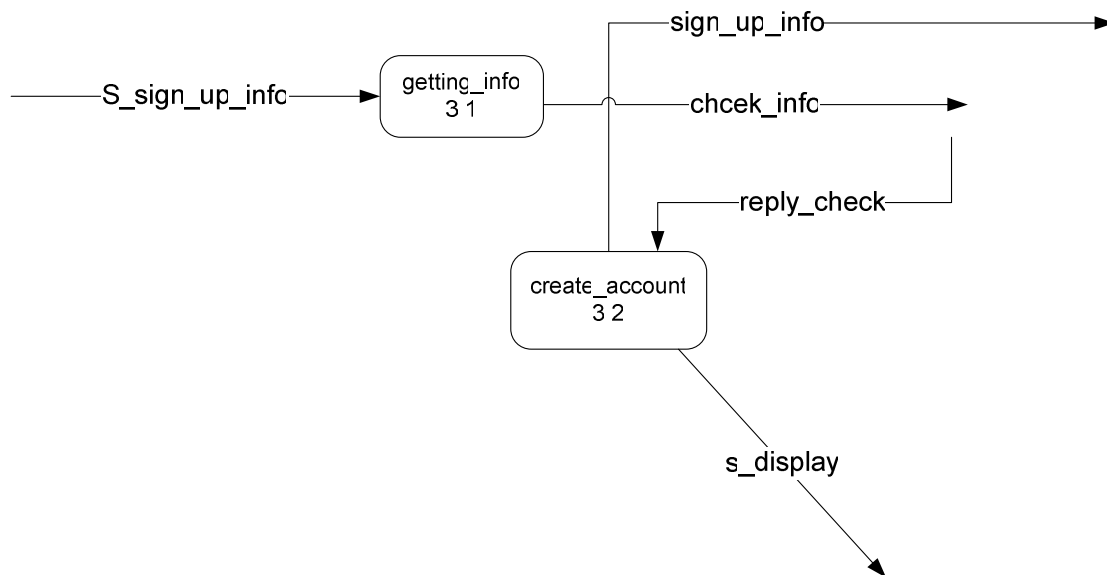
b. DFD: Level 1 for "Isteis"



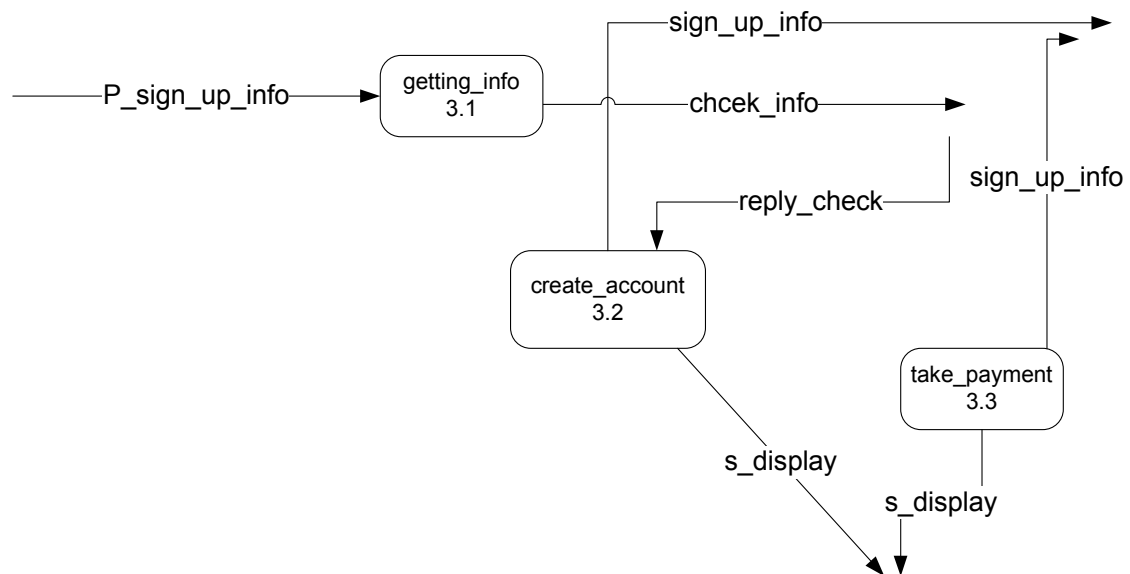
b. DFD: Level 2 Sign Up 1.1



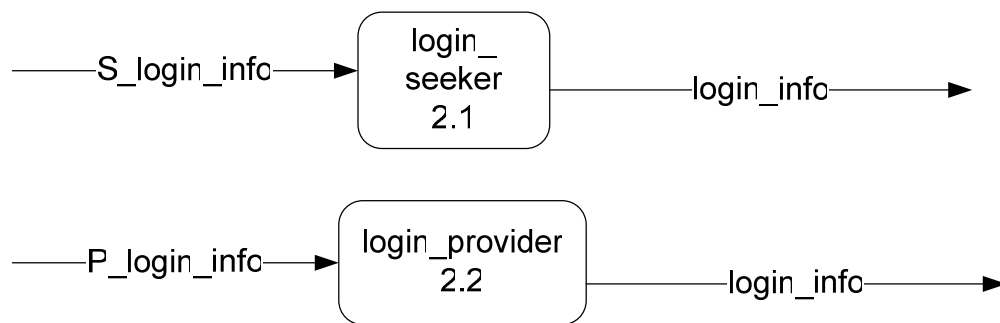
d. DFD : Level 3 Seeker Sign Up 2.1



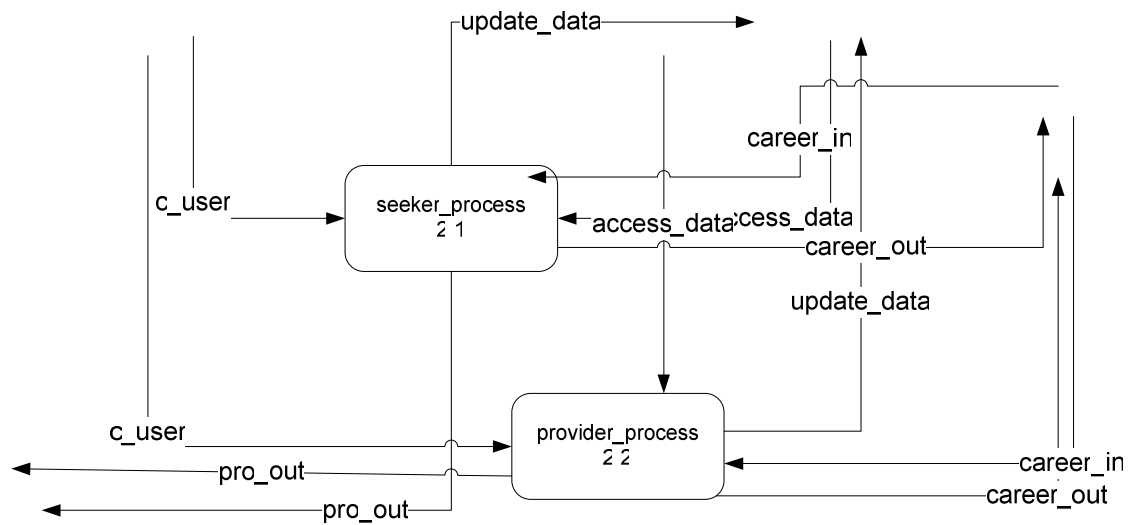
e. DFD : Level 3 Provider Sign Up 2.2



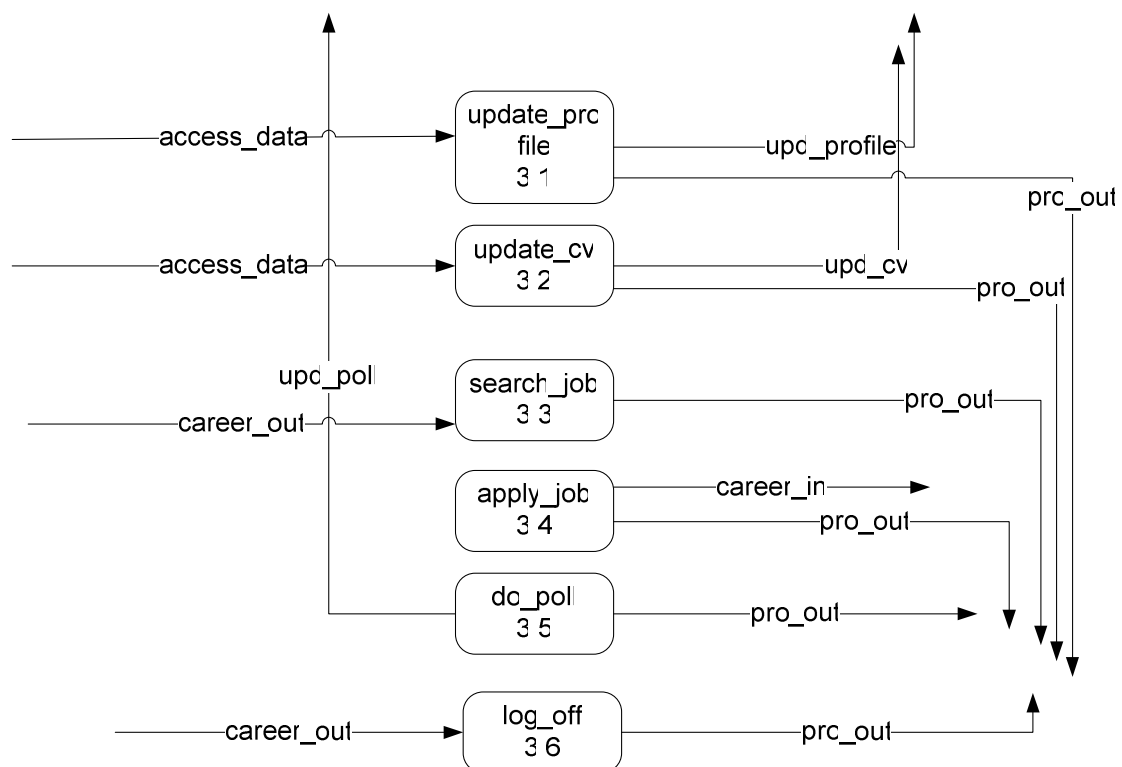
f. DFD : Level 2 Login 1.4



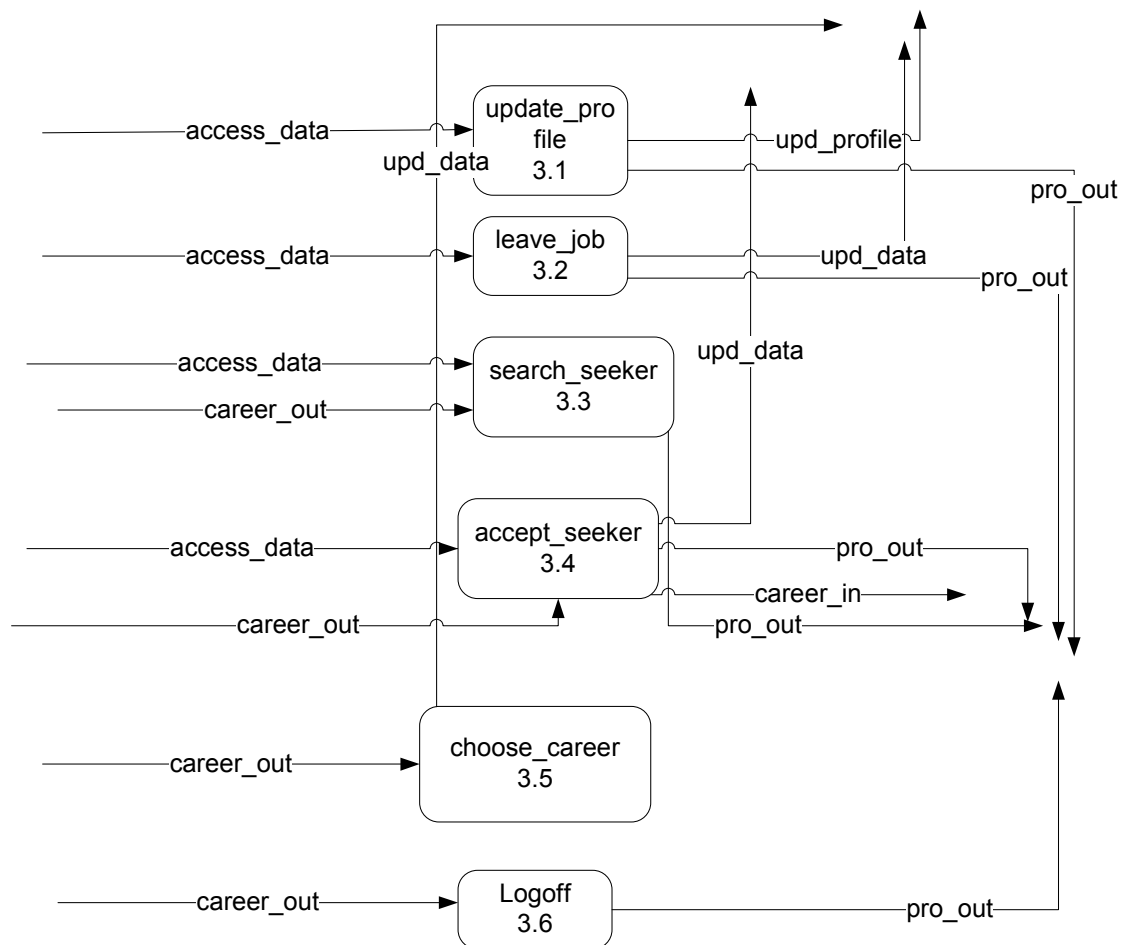
g. DFD : Level 2 Process for user 1.3



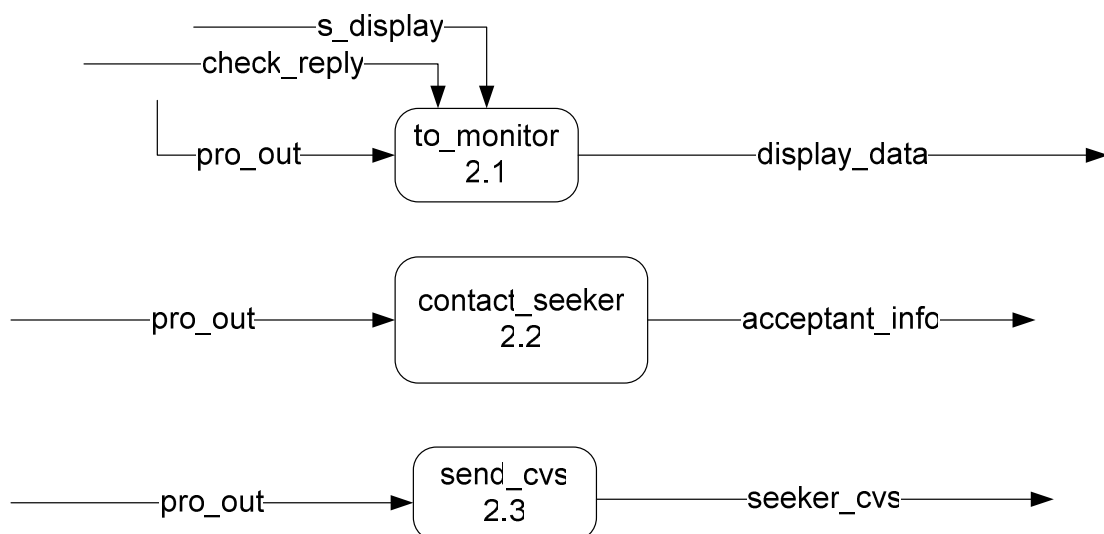
h. DFD : Level 3 seeker_process 2.1



i.DFD: Level 3 provider_process 2.2



j. DFD : Level 2 Process Output 1.5



5.1.3 Data Dictionary

Name	S_info
Input	Isteis
Output	Job Seeker
Description	Information of job seeker for sign up and login

Name	P_info
Input	Isteis
Output	Job Provider
Description	Information of job provider for sign up and login

Name	Seeker_cvs
Input	Job Provider
Output	Process Output
Description	CVs of the job seekers

Name	display_data
Input	Monitor
Output	Process Output
Description	Display data for the monitor

Name	acceptant_info
Input	Job Seeker
Output	Process Output
Description	information or email that the company accepts and offers a job to the job seeker

Name	Career_in
Input	Career

Output	Process for users
Description	information to the career web page

Name	Career_out
Input	Process for users
Output	Career
Description	Access information from the career web page

Name	sign_up_info
Input	data for user
Output	Sign Up
Description	sign up information to store in the database

Name	check_info
Input	Checking
Output	Sign Up
Description	information to check that it is already exist in database

Name	reply_check
Input	Sign Up
Output	Checking
Description	checking result

Name	s_display
Input	Sign Up
Output	Process Output
Description	result of sign up to display in the monitor

Name	data_out
-------------	----------

<i>Input</i>	data for users
<i>Output</i>	Checking
<i>Description</i>	data from the database to do checking

<i>Name</i>	Access_data
<i>Input</i>	Process for user
<i>Output</i>	data for users
<i>Description</i>	available information stored in the database such as current user information, search result, etc

<i>Name</i>	Update_data
<i>Input</i>	data for users
<i>Output</i>	Process for user
<i>Description</i>	data to update the database

<i>Name</i>	c_user
<i>Input</i>	Process for user
<i>Output</i>	Checking
<i>Description</i>	pointer of the user

<i>Name</i>	check_reply
<i>Input</i>	Process output
<i>Output</i>	Checking
<i>Description</i>	checking result to display in the monitor

<i>Name</i>	pro_out
<i>Input</i>	Process for user
<i>Output</i>	Process output
<i>Description</i>	data to show in the monitor and to send to the user

5.2. Use Case Analysis

We have grouped use cases according to our user groups : Job Seekers and Job Providers.

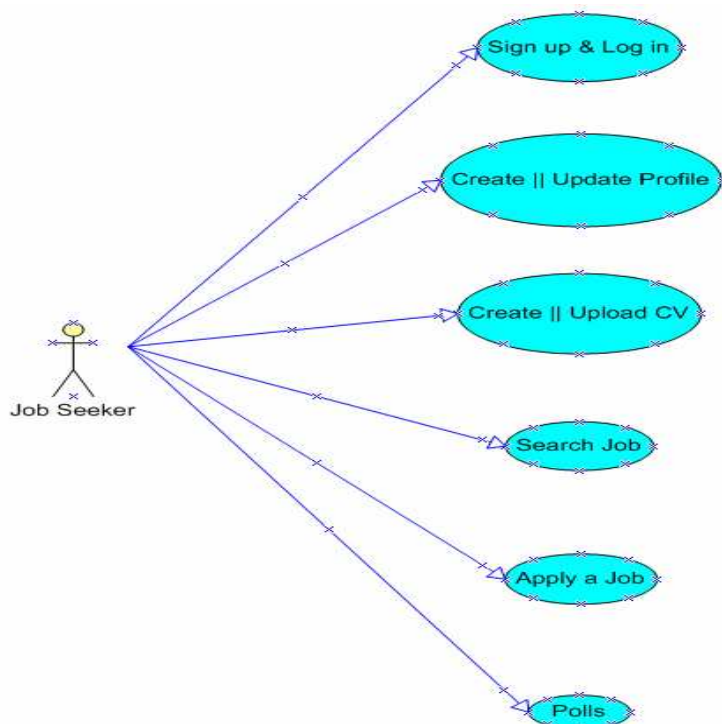
Job Seeker Use Cases

The set of activities or functions performed by a job seeker on our portal are listed below.

A job Seeker can ,

- Sign up and then log in to our portal.
- Create a profile and update it in time.
- Create or upload CV in any format (video , .doc , standard form)
- Search through job offers
- Apply to a position
- Take our evaluation polls

Preliminary Use Case Diagram for Job Seeker on our Portal



Job Provider Use Cases

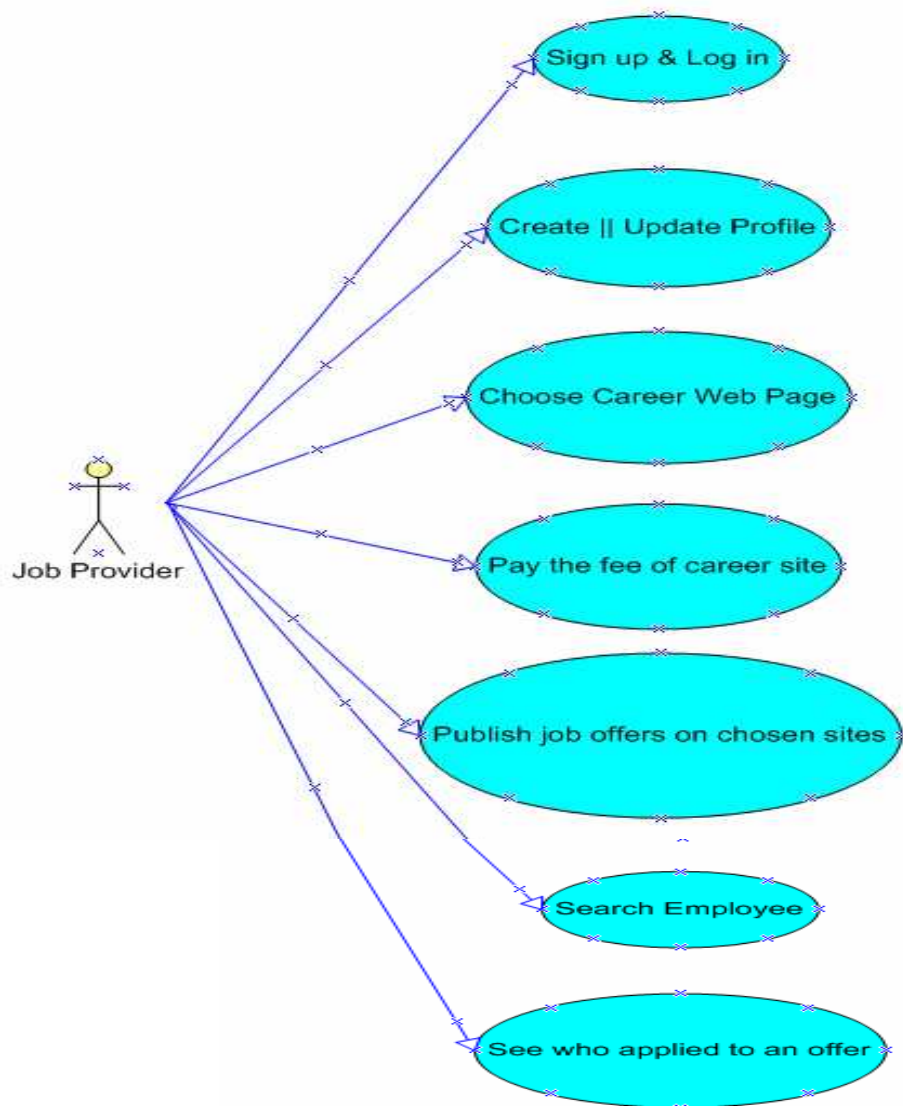
The activities of other user group of our portal , Job Providers can be listed as ;

A Job Provider can

- Sign up to our portal by paying the membership fee.

- Log in and then create a profile with necessary information.
- Update profile informations
- Choose career web site to become a member and publish job offers.
- Pay the fee of the career web site that is chosen.
- Search through job seekers to find appropriate employer.
- See job seekers applied to their published job offers.

Preliminary Use Case for Job Provider on our Portal



Use case: Sign up and Log in

Primary Actors: Job Seekers and Job Providers

This use case applies to both user groups. Job seekers and job providers have to sign up to use our portal. We provide each group a different sign up module. A job seeker needs to fill in his/her user id, password, personal identification number, e-mail address and an answer to secret question for security issues. However, job providers have to enter their tax id besides the company user id, password, e-mail address and a secret question. It is necessary to pay the membership fee to finalize the sign up process for companies.

For log in process both user groups has to enter correct user ids and passwords to the spaces provided if any of these values unmatches with the ones provided during sign up process, a warning will appear on the screen.

Use Case: Create and/or Update Profile

Primary Actors: Job Seekers and Job Providers

After signing up to our portal, both user groups has had a profile which they can change or update whenever they need or want. On a job seeker's profile, we can see their actual names, surnames, mother's surnames (for security issues), if they have uploaded any CVs and if they have we can see these documents. Job seekers can change their user ids or passwords through their profiles. We can also see their situation whether they applied to a job, they are still searching or their positionig has occured. Job seekers can see all the job offers that they apply or want to follow through their profiles.

Job providers' profile holds their company informations, user ids, passwords, they can change these informations any time they need or want. And also they can see the list of career web pages that they have a membership on, their payment situations on both career web pages and our portal. The job offers that are being published on any career web site and their previous job offers.

Use Case: Create and/or Upload CVs

Primary Actors: Job Seekers

Job seeker users of our portal can either create their CVs by filling in standard form that we provide on our portal or they can upload their CVs as documents in .pdf or .doc format or as video streams to one of the video upload web pages from the list that we have provided.

Use Case: Search Job

Primary Actors: Job Seeker

We provide a job search module for job seekers where they can see resulting job offers coming from all career web pages that our portal cooperates. They can also see on which career web site the subjected offer is being published. The categories which jobs are grouped are mainly the country, the city, company, publish date, job area, department, position. All the choices in each category will be listed in a drop down menu to make the searching process easy for job seekers. Also more detailed search parameters can be provided for users in detailed search screen like title, position level, education level, job experience, job style.

Use Case: Apply Job

Primary Actors: Job Seeker

We will implement an application module which works in the same way as the source career web page of listed offers. We will provide the description of the job offers as they are published on the career web page and our users can apply to any of these offers through this module.

Use Case: Polls

Primary Actors: Job Seeker

We will give polls to our job seeker users after their positioning occurs to get feedback from them about both our portal and our cooperate career web sites. These feedbacks help us updating our statistical data on career web pages and etc.

Use Case: Choose a Career Web Page

Primary Actors: Job Provider

Job provider users need to choose and then sign up to a career web page to publish their job offers on at least one of them. To make this easy we provide a selection module for them. We have compared and scored our cooperate career web pages on different categories such as their membership fees, extra services and the statistics of their preference by job seekers, numbers of positioned job seekers to published offers on their web sites on this module.

Use Case: Pay the Membership fees

Primary Actors: Job Provider

Different payment modules will be built for both payment of our portal's membership fee and the transfer of payment fees of chosen career web pages. The payment of career pages fees will occur in their ways. Job providers just enter the necessary information through our portal and then if they approve, transfer will be made. After the transfer, job provider will be informed about the situation.

Use Case: Publish Job Offers on Career Web Pages

Primary Actors: Job Provider

After becoming a member of the chosen career web sites , job providers can publish their job offers on these web sites through our portal. We will provide a job offer form which is like the standard form of the actual career page that publishes the offer. Job providers need to fill in this form for each of their offers and set the date of publishment. After they approve all these information, their offer will be sent to career web page and published.

Use Case: Search Employee

Primary Actors: Job Provider

Job providers can search employers for their vacant positions by this module on our portal. The categorization of job seekers can be made according to their experience on the job area, educational information, age, sex. Job providers only allowed to see job seekers who are also members of the career web pages on which they have membership. Job seekers' CVs and contact informtions will be available for job providers through this module.

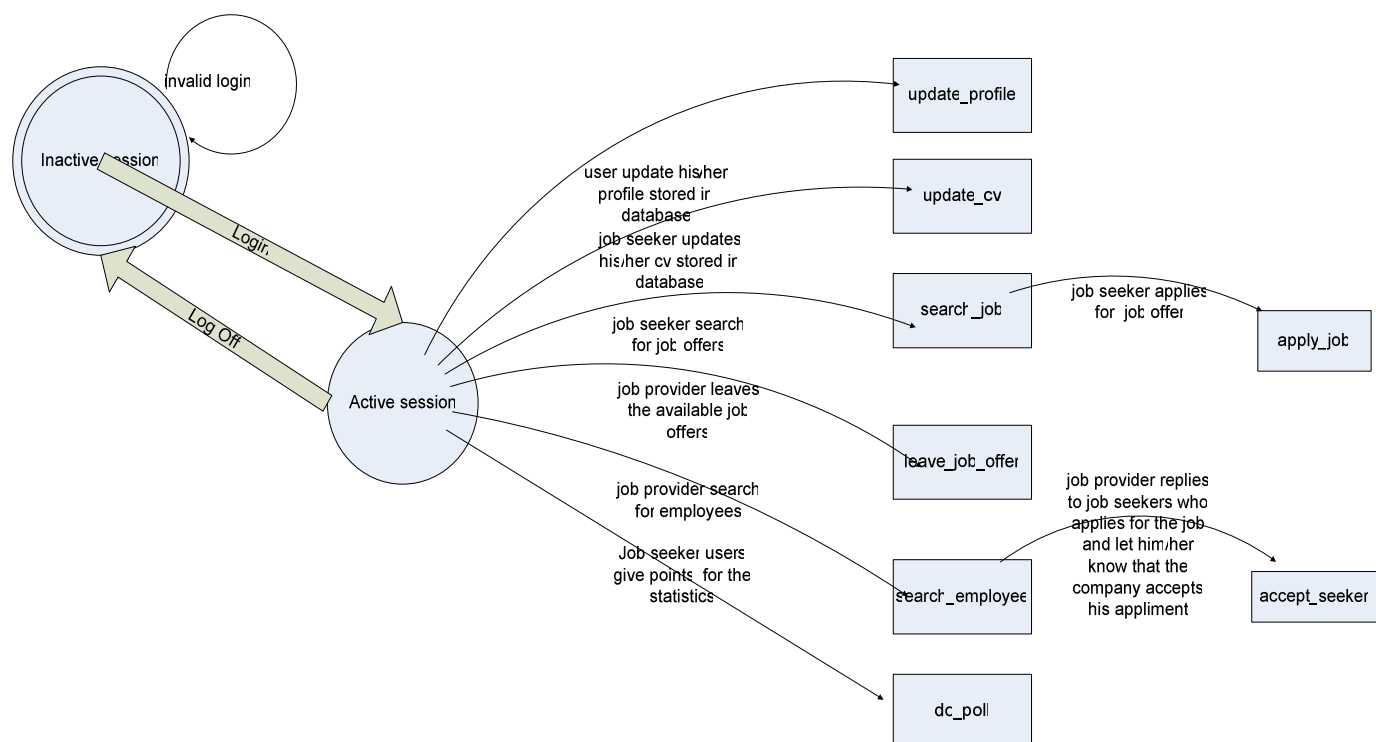
Use Case: See Who Applied to an Offer

Primary Actors: Job Provider

Job providers can see who applied through our cooperate career web pages to any of their published offers by this module. The same detiled information available about job seekers applied to these offers on Search Employee Module will also be reached through this module.

5.3. Behavioral Modelling

5.3.1 State Transition Diagram



As shown in the state transition diagram, we can divide the Project into two main states: inactive session and active session. First of all, the user needs to login so that he/she can pass from inactive to active session. If the user successfully login to the system, then there are several main tasks he/she can do. These six main tasks are update_profile, update_cv, search_job, do_poll, leave_job_ and search_seeker. Since the user can be job seeker or job provider, some of the tasks can be accessed by specific user. In general both users can choose update_profile task. A user can update his/her profile which is stored in the system's database. If a user is a job seeker, he/she can do update_cv task, search_job task and do_polls task.

After available job list is searched by search_job task, a user can do apply_job task. In the do_poll task, a job seeker user can give points for the statistics result. On the other hand, a job provider can access for leave_job_offer task, search_employee task. After finding available employee from search_employee task, the job provider can do accept_employee task. A user can easily go to the inactive session by login off in every state. As a result, all the main tasks can be done only if the user is in active session.

6. PROJECT SCHEDULE

6.1. Project Task Set and Workpackages

The tasks and the schedule of our project is determined in detail since we have a strict deadline. Consequently our work packages are predicated on the reports that have to be prepared and the scheduling is predicated on their deadlines.

Our first work package (WP0) is based on understanding the project. Determining the project scope and subtasks were included in this package. They can be derived from our proposal report.

The rest of the work packages are listed below:

WP1: Requirement Analysis

This workpackage includes mostly the researches and specifications about the project. The tasks are listed below:

- Literature Survey
- Existing System Analysis
- SOA&Web Services Research
- Decision of Services
- *DER: Project & Technology Overview Report
- Project Scheduling
- Data Modeling
- *DER: Metadata Report
- Requirement Specification

- Functional Requirements
- Non-functional Requirements
- System Requirements
- DFD Modeling
- Use Case Modeling
- Time & Effort Estimation
- *DER: Requirements Analysis Report

WP2: Job Seeker Side Design

WP2, WP3, and WP4 are based on designing. Work Package 2 includes designing the graphical user interface, the database, and the process management for the functions which will be provided to a job seeker. Tasks are indicated below:

- Sign up& Log in Modules
- Profile & CV Update
- Job Search Module
- Job Application Module
- *DER: Initial Design Report

WP3: Job Provider Side Design

Work Package 3 is identical to WP2, except it includes the design of the job provider side.

- Sign up& Log in Modules
- Career-Job Site Selection & Membership Module
- Payment Module
- Employee Search
- Job Posting Module
- *DER: Initial Design Report

WP4: Final Design

Final design starts with the review of the initial design and continues with doing the last modifications and adjustments on it. Tasks are indicated below:

- Initial Design Review
- Detailed GUI Design
- Detailed Database Design
- *DER: Final Design Report

*("DER:" stands for derivable from)

6.2. Gantt Chart

You can see our Schedule as a Gantt Chart under Appendix.

7. TIME and EFFORT ESTIMATION

In this project, FP-Based estimation system will be used. The reason why we had chose this system is that FP-Based estimation system focuses mainly on information domain values rather that software function. Here is the table of domain value estimation.

Information Domain Value	Optimistic		Simple Weight Factor	Average Weight Factor	Complex Weight Factor	FP count
Number of external inputs	10	X	3	<u>4</u>	6	40
Number of external outputs	15	X	4	<u>5</u>	7	75
Number of external inquiries	10	X	3	<u>4</u>	6	40
Number of external logical files	10	X	7	<u>10</u>	15	100
Number of external interface files	0	X	5	<u>7</u>	10	0
Count total						255

And complexity adjustment factor can be found as table shown below.

No.	Factor	Value
1.	Does the system require reliable backup and recovery?	4
2.	Are data communications required?	5
3.	Are there distributed processing functions?	2
4.	Is performance critical?	1
5.	Will the system run in an existing, heavily utilized operational environment?	4
6.	Does the system require on-line data entry?	5
7.	Does the on-line data entry require the input transaction to be built over multiple screens or operations?	2
8.	Are the master file updated on-line?	4
9.	Are the inputs, outputs, files, or inquiries complex?	3
10.	Is the internal processing complex?	3
11.	In the code designed to be reusable?	4
12.	Are conversion and installation included in the design?	2
13.	Is the system designed for multiple installations in different organizations?	3
14.	Is the application designed to facilitate change and ease of use by the user?	3
	Total Adjustment Factor =	45

(0 = No influence, 1 = Incidental, 2 = Moderate, 3 = Average, 4 = Significant, 5 = Essential)

As a result total complexity adjustment factor = 45

Therefore the estimated FP can be calculated by the following formulae

$$\mathbf{FP_{estimated} = count-total \times [0.65 + 0.01 \times (\sum Fi)]}$$

$$\mathbf{FP_{estimated} = 255 \times [0.65 + 0.01 \times 45]}$$

$$\mathbf{FP_{estimated} = 280.05}$$

The total lines of codes can be calculated such as $\mathbf{LOC = FP_{estimated} \times 20}$, where we multiple with 20 because we are going to use some web programming language which can be considered as 4th generational language. As a result,

$$\mathbf{LOC = FP_{estimated} \times 20}$$

$$\mathbf{LOC = 280.05 \times 20}$$

$$\mathbf{LOC = 5610.00}$$

And finally, the efforts and Duration can be obtained by by using *COCOMO* model, where the complexity of our project can be assumed as “organic” type. So, the appropriate values for the constants are $a_b = 2.4$, $b_b = 1.05$, $c_b = 2.5$ and $d_b = 0.38$.

$$\mathbf{Effort = a_b (KLOC)^b_b}$$

$$\mathbf{Effort = 14.68}$$

$$\mathbf{Duration = c_d (E)^d_b}$$

$$\mathbf{Duration = 6.94 \text{ months}}$$

The time estimation of our project is about 7 months.

APPENDIX

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