PAYROLL MANAGEMENT SYSTEM

Course: IT314-Software Engineering

Course Instructor: Prof. Rakesh Shukla

Team #12: SEnsational

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[SOFTWARE REQUIREMENT SPECIFICATION]

[20th March, 2008]

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[20th March, 2008]

1. INFORMATION

1.1. Document version & contribution details

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Introduction	Shiva Sai Krishna Prasad, Anvesh, Ravi Shankar	Satish Chandra, Anvesh
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Feasibility Analysis	Satish Chandra	Praveen
Requirement Analysis	Poornachand, Varun Raj, Praveen	Vasavi Kumar, Hima Kireeti, Anil Kishore
Software Process Model	Satish Chandra, Vivek,	Praveen
Project Plan	Praveen, Vivek	Poornachand
Estimation	Vasavi Kumar, Satish Chandra, Anil Kishore, Vivek	Satish Chandra, Vasavi Kumar, Anil Kishore, Vivek
Test cases	Vasavi Kumar	Hima Kireeti
User Manual	Vasavi Kumar,Varun Raj	Hima Kireeti
Glossary/ Abbrevations	Shiva	Vasavi Kumar,Review
Database Design	Hima Kireeti, Vivek, Satish Chandra, Ravi Shankar	Anil Kishore, Vasavi Kumar
Integrating Document	Shiva , Praveen,Ravi	Vasavi kumar

Date	Version	Description
19th February, 2008	1.0	Rough draft
20th February, 2008	1.1	Final Document
21st March, 2008	1.2	Revised document(Final)

1.2. Client and stakeholder details

Client:

Mr. Ramesh Patta,

Project Manager/ Director,

Vertical Softech Markets Pvt Ltd.,

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Stakeholders of the project:

Team #12 Btech2005 batch, Software Engineering, DA-IICT.

Mr. Ramesh Patta, Project manager/director, Vertical Softech Markets Pvt. Ltd.

Employees of the company Vertical Softech Markets Pvt. Ltd.

1.3. Visibility Plan

A very important part of the project is the 'visibility plan'. It helps to keep in contact with the client and the stakeholders of the project as well as tracks the current progress of the project. We need to communicate regularly with the client and other stakeholders for a consistent progress and proper working of the project plan.

The following is the visibility plan being adopted by our software engineering team:

Maintaining contact with the client:

- A specific subgroup is formed for the client meetings. Agenda of the client meetings and minutes of client-meeting are managed by two of the group members. Agenda is prepared well before the meeting time.

- A time is fixed for meeting with the client (every week, Sunday 7:00 PM) and contacted through chatting over instant messengers.

- Queries are also asked through emails.

- In case of lack of availability of internet for chatting, contact with the client is made by phone call (optional backup).

***Maintaining contact within the team**:*

- Fixed time for weekly meetings (10:00 PM every Tuesday, Thursday and Saturday) is followed. All the team members gather to a particular room which is fixed. Every team member is assigned some work, either to be done in a team or individually.

- The agenda for the team meeting is prepared well before the meeting by a fellow group member. The work done here may be assisted by other fellow team members. In case of lack of availability of this team member, he informs in advance to any of the team members, and the agenda is formed accordingly by the other member(s).

- Minutes of the team meeting is maintained by one of the two group members. Switching may take place between the two. Also, in the absence of any one of the team member for writing the minutes of team meeting, the other takes up the task. In case of non availability of both the team members assigned for this work, this task is managed by any one of the team members voluntarily.

- On the requirement of the group, additional meetings are also scheduled [usually around 10:00 PM].

- Deadlines are followed for completion of the work assigned to each of the team members.

- In Case of unfavorable circumstances, for example the power failure or any natural calamities which are outside our control, rescheduling of time and venue of the meeting is decided. This is decided in a group of available team members and others are required to know from them and are completely upon the individual for knowing the new meeting details.

- Changes in venue and time of meeting are informed in person and email.

- Google Groups is used as common platform for information and file sharing.

- In case a team member is not available for a particular period of time, he informs one of the team members who is available for the team work. The reason could be his illness or lack of availability due to some important work.

2. PROJECT

2.1. Introduction of the project

The purpose of our payroll management system is to keep track of the employee salary records of the company (Vertical Softech Markets Pvt. Ltd.). The employee records can contain details like the salary earned, loan taken and leaves availed by the employee.

Our "payroll management system" is being designed for **Mr. Ramesh Patta** who is project manager/director of the company named "**Vertical Softech Markets Pvt. Ltd."** This payroll software reduces the effort of manually entering and maintaining the employee related data, both non-confidential and confidential, thereby reducing the errors that creep in due to manual intervention and processing of the data. It also reduces the time needed for performing the payroll tasks by reducing the work to be done manually. Thus our payroll software increases the efficiency over the primitive hand written procedures and maintenance.

2.2. Scope of the project

Our payroll management system, **Payman**, is a web based application. It is intended to help perform the actions of creating employee accounts, employee authentication, providing staff privileges of administrator or non-administrator according to his/her designation in the company and the company's requirements, salary transactions of the employees, loan details, bank details for any money related transactions, leaves availed by an employee, maintain holiday list and update it, maintaining a calendar, tracking additional payments or deductions, conversion of overtime into holidays in attendance register of each employee and tax calculations based on the above money related transactions.

Our payroll management system is intended to be used for the staff of strength 75. Any record which has to be modified or data which involves high risk or data which is confidential only happens through the administrator [managerial]. The administrator [technical] configures the software and maintains the conditions for the proper working of the software.

2.3. Suggested deliverables [1]

The following table gives the suggested deliverables in each phase

S.No.	Phase	Suggested deliverables
1	Requirement gathering and analysis	Vision Document Software Requirement Specification document Activity diagram User Manual

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2	Design and Planning	Design model Use case model Data Flow diagram ER diagrams
3	Development and Testing	User Manual Test Cases Alpha Testing Beta Testing
4	Deployment	Release Notes Final Product Source code Documentation

2.4. Technical requirements

Probable technical requirements for the project development:

1. SCM tool: Microsoft Visual SourceSafe 2005
2. Dot Net Platform
3. AJAX(Asynchronous Java and XML)
4. Database: SQL Server 2005
5. Operating system: Windows XP
6. Project Planning: Microsoft Project
7. Web browsers: Internet Explorer, Mozilla Firefox
8. Testing software: Microsoft application Center Test

Probable technical requirements for running the software:

Software Requirements

The user needs a standard internet connection of 56 kbps or a LAN connection to view the software. The portal can be viewed on a web browser. Also, we need a dot Net platform to be available on all the systems that use this software and a Web browser.

The following web browsers can be used:

- Mozilla(2.0 +)
- Firefox(2.0 +)
- Internet Explorer(6.0 +)

Hardware Requirements

The application does not interact with any additional external hardware, but the computer. The computer system is to be equipped with the following hardware requirements for proper functioning:

- 256 MB or greater of RAM (Physical Memory)
- Processor - 'P3' or greater
- Additional Hard disk space for software installation of at least 100MB
- Ethernet Card(10/100)

3. ANALYSIS

3.1. Risk Analysis [2]

*"**Risk** is some adverse circumstance that may happen and affect negatively the project. **Risk management** means anticipating risks and preparing to reduce their effect."*[4]

Risks for the Payroll management system project have been identified and the probability and the impact for each of the identified risks, along with management plan are provided in the following "Risk Table". Risks have been ordered according to the rank of the Risk. [3]

Risk Seriousness (impact)

- Insignificant (1)
- Tolerable (2)
- Serious (3)
- Very Serious (4)
- Catastrophic (5)

Risk Probability Scale

- Very low (< 10%)
- Low (10% - 25%)
- Moderate (25% - 50%)
- High (50% - 75%)
- Very High (> 75%)

Risk Table

Risk	Category	Probability	Impact	Risk Management
Insufficient knowledge in C#.NET, ASP .NET, AJAX	TECHNOLOGY RISK	High	Very Serious	Refer to online resources, e-books and senior students who have prior experience in .NET framework. Session by peer members having knowledge in ASP.NET
Difficulty in coping with pressure due to other courses	SCHEDULE RISK	Very High	Serious	Revise the schedule to distribute the work.
Under estimation of Payroll management project size	PRODUCT SIZE RISK	Moderate	Serious	Revise the scope of the project.
Unable to integrate Salary, Leave and Loan modules	DEVELOPMENT ENVIRONMENT RISK	Moderate	Serious	Understand the dependencies properly and follow uniform coding style.
Database server Crash	PERFORMANCE RISK	Very Low	Catastrophic	Backup all the records at regular intervals so that they can be restored after a crash.
Unavailability of Team Members	SCHEDULE RISK	Low	Serious	Reorganize the team so that there is more overlap of work.
Insufficient Business Knowledge in Payroll management	PROCESS RISK	Low	Tolerable	Refer to the terminologies used and gaining assistance from the client.

Unrealistic Deadlines for deliverables	SCHEDULE RISK	Low	Tolerable	Increase and reallocate resources. Identify parallel tasks and revise schedule in the plan to account for unforeseen events.
Inconsistent documentations and reviews	PROCESS RISK	Low	Tolerable	Frequent review and analysis of documents by other team members, Inform the developers about the reviews made.
Radical changes to the requirements	PROCESS RISK	Very Low	Serious	Design of the project should be made flexible so that it can be changed quickly and easily.
Technology change	PROCESS RISK	Very Low	Tolerable	More flexible and modular code should be written, to change it accordingly.
Unavailability of system / tools	DEVELOPMENT ENVIRONMENT RISK	Very Low	Insignificant	Prior planning for availability of systems with required tools like Visual Web Developer Tool, Microsoft SQL server 2005 and Visual Studio.
Miscommunication and conflicts among team members	SCHEDULE RISK	Very Low	Insignificant	Resolve them based on the opinion of the majority.

** For the definitions of the each of the category of the risk, details of the mitigation and contingency plan for the top risks, please refer Annexure-A.

3.2. Feasibility study analysis [5]

Overview:

Payroll Management System deals with maintaining the salary details of employees in a company. The Salary details depend on many parameters like his Salary Structure, his Attendance, Loans, Tax and Leaves taken by him. Payroll Software is being used in almost every company to ease the process of salary payment and Vertical Softech Markets Pvt Ltd not having a Payroll Software have given us the work of developing it for them.

Feasibility Study:

- **Operational:**

Performance: The complexity of maintaining the details of various parameters related to salary of an employee is reduced to such a great extent by our software that it results in adequate throughput and response time.

Information: As our system systematically organizes all the information in a modular form, the end-users and managers are provided with timely, pertinent, accurate and usefully formatted information.

Economy: Our system does not directly reduce the cost of the business or the profits of the business but saves a lot of time and resources, which can be utilized in economy gain activities.

Control: We are building our application using .Net, SQL Server 2005, ASP.Net which provides adequate controls against fraud and security.

Efficiency: We are efficiently using human resources and time by identifying the abilities and skill sets of a person and assigning the appropriate module to him. Efficiency is also maintained by using SCM tool to do our work thus reducing the delays due to flow of forms and processing.

Services: Our system does provide desirable and reliable service to our end-Users. Our system is flexible and expandable, like the Admin can add a new type of Leave and update the list of types of leaves the company is providing. Also new features can be easily added as modules to our project as we are doing the project in a modular fashion.

- **Usability Analysis:**

With our simple and easy to use interfaces provided by the software, the employees will find our software user friendly.

- **Technical:**

The technologies we are using are Microsoft Visual Studio 2005 as the Development Platform, Microsoft SQL Server 2005 as the Database, AJAX to make the web interface dynamic and ASP.Net to access and retrieve information from Database. Some of the members are skilled in the above technologies and will take sessions for others who don't know. Since we are having good programming background, we feel getting acquainted with the technologies will not be a problem.

- **Schedule:**

Our project contains many modules but none of the modules are complex. With proper planning and management of our schedule, we feel a 4 month period is sufficient enough to complete our project. With many of us technically sound with the technologies, we feel we can meet our deadlines. From our project plan we find that a 3 ½ month period from January 7th to April 18th is sufficient to do our project. Using semi-detached COCOMO (refer ANNEXURE-B), we got an estimation of 51 days to complete the project. Using use-case point estimation, we got an estimation of 2.81 months to complete the project. So given the time duration of three and half months (one semester), we feel that we can complete the project and also actively learn all through the period.

- **Economic:**

The technologies we are using for our project like Microsoft Visual Studio 2005, Microsoft SQL Server 2005 were provided by our college. Also computers needed to work on are also provided by the college so System Development Costs are minimal.

Feasibility Analysis Matrix [5] ,[6] ,[7] ,[8] ,[9]

Feasibility Criteria	Weight	Candidate 1	Candidate 2	Candidate 3
Operational Feasibility Functionality: A description of to what degree the candidate solution will benefit the organization and how well the system would work. Political: A description of how well received this solution would be from both user management, user and organization perspective.	30%	Reduces the complexity in maintaining the various dependencies related to a salary of an employee. Score: 100	Same as Candidate 1 but no Usability analysis has been conducted which is important. Score: 90	I think Usability analysis is not as Important as the users are computer users and will find it easy to deal with the software taking into account. Score: 95
Technical Feasibility Technology: Assessment of maturity, availability, and desirability of the computer technology needed to support this candidate. Expertise: Assessment of the technical expertise to develop, operate and maintain the candidate system.	30%	Use of Microsoft Visual Studio 2005, AJAX, ASP.NET and SQL Server2005 which are the latest technologies which are being used, we can await a grand product. Score: 100	Candidate 2 has not taken into account that many of the developers are going to learn and use AJAX, ASP.NET for the first time and given the schedule constraint, a lot of hard work needs to be put in. Score: 65	The developers are fast learners as they are from a good college and so it might not be very difficult for them, but they need to strap their boots and run otherwise they are not going to make it. Score: 80
Economic Feasibility	30%	Economic feasibility is not an issue as most of the facilities are provided by the college for free.	Same as Candidate 1	Same as Candidate 1

		Score: 100	Score: 100	Score: 100
Schedule Feasibility Assessment of how long the schedule will take to design and implement.	10%	Around 4 months. Score: 90	Less than 3 months. Score: 100	Around 4 months. Score: 90
Ranking	100%	99.0	86.5	91.5

4. REQUIREMENT ANALYSIS [10], [14]

4.1. Discovery technique

Questionnaire, Background reading, analyzing existing payroll software and chat with client are our project requirement discovery techniques.

4.2. User Requirements

1. The Administrator/Employee should have their respective accounts by which they can login and access their details.
2. A provision for creation of a new employee should be there.
3. Every employee should be able to update his/her details.
4. Need to keep details of the financial institutions in which the company has accounts.
5. A provision for maintaining a list of holidays and updating them when required should be there.
6. Should be able to keep track of the attendance and thus the leave of each employee.
7. Should be able to define the type of attendance like hourly, session wise, and daily.
8. Provision for keeping track of no. of overtime sessions should be there.
9. Should be able to keep records of loan details taken by each employee. Loan details include loan taken, due date of repay, due amount to be paid.
10. A provision for defining the salary structure should be there.
11. The salary structure should include allowances like HRA, DA, allowances. Allowances include conveyance allowance, reimbursements, bonus and performance incentives. Salary Structure should also include deductions which include loan repayment, taxes and PF's.
12. Software should be able to generate reports like salary sheet, pay slip, bank statement, attendance report, overtime report, variance report, additional payments, increments, PF reports, annual reports, loan reports, leave reports, salary certificates, bonus, and reimbursements.

4.3. System requirements

4.3.1 Functional Requirements [13]

1. The end user i.e. the employee or the administrator can login into the software using his/her username and password.

2. Various user accounts for the employees can be created.

3. If the employee already exists, then the system denies such an operation.

4. All the company details along with the financial institutions' details in which the company has accounts can be entered.

5. The profiles of all the employees of the company can be updated.

6. Various salary ranges and the corresponding income tax, professional tax and the provident fund (a defined percentage of salary) can be defined.

7. Various salary structures can be defined on the basis of defined salary ranges of the employees.

8. The company calendar for the entire financial year can be filled along with the holidays' list which can be updated down the line. The system denies the operation of updating the holidays' list of the past dates.

9. The type of attendance which has to be given to the employees in their attendance register can be defined.

10. The attendance of the employees can be filled with the defined types of attendance which can keep track of the no. of present days of the employee, the no. of days in which he/she has taken a half day leave (present in only one session) and the no. of days on which the employee has taken leaves. The employee can also work overtime (working 3 sessions in a day) and the system can also keep track no. of sessions he has worked overtime.

11. The software can hence keep track of the no. of leaves availed by each employee and the corresponding dates on which leave has been availed.

12. The system can also show the details about who all have taken a leave on a particular date using filter options.

13. The system provides services to store all the loan details availed by all the employees of the company. All the loans availed by any employee can be easily displayed along with the status of recovery and the total due amount can also be easily derived from the software. The loan repayment is through installments that can be directly reflected in the salary's net deductions for a month.

14. The salary calculations of any employee can be done based on the defined salary structure which has allowances like HRA, DA, conveyance allowance, special allowance as parameters. Various other allowances like reimbursements, bonus and performance incentives may get added to the salary. The deductions include loan repayment as one of its major components along with the defined taxes and provident fund.

15. The software can generate monthly reports like salary sheet, pay slip, bank statement, attendance report , overtime report, variance report, additional payments, and increments. The software can also produce other reports like PF reports, annual reports, loan reports, leave reports, salary certificates, bonus, and reimbursements.

4.3.2 Non-Functional Requirements

Non functional requirements are the constraints on the services or functions offered by the system consists of timing constraints, performance, security, reliability, constraints on development process and standards.

4.3.2.1 Product Requirements:

a) Performance requirements

- The payroll management system is a web-based portal and hence many variables like net speed, server, operating system and client browser affect performance of the system.

- It has to be kept in mind that the software is designed to be a multi-user system, and hence increase in the number of users should not affect the individual response time of each user, which should not fall below an optimum range.

- There is no hard limit on the total number of queries executed in the software.

- The size of the database is not fixed and it subsequently grows on addition of new records in employees, loans and salaries.

b) Security, Recovery and Usability requirements:

Since the payroll data is highly sensitive, a high level of security is required.

- The end users and administrators will be given unique username and passwords to view or edit exclusive pages depending on their permissions to access the data.

- For security reasons, the web based application logs off the user after a certain duration of inactivity. In order to regain entry to the system, the user must log back in.

- The system automatically logs off the user when the application is shut down by any means. In order to regain entry to the system, the user must log back in.

- If any user logs out, then the session is said to be closed and he has to login again to use the software i.e. he cannot get back with simply using 'Back' button of the web browser.

- The system would use a secure database and application server, so that an unauthorized person cannot access, or change present data.
- System administrators are given edit privileges on the application server.
- We intend to have a backup of the entire system along with the information in order to address the problems like power failure, disk failure etc.

4.3.2.2 External Requirements:

a) Safety Requirements
Since the use of the software do not account for any possible loss, damage or harm of any kind, no safety requirements have been identified.

b) System Size [4]:

- Number of employees in the company - 75
- Number of HR or administrators - 5

4.4 Traceability matrix [11],[12]

Ri is the id of the ith indexed requirement of the user requirements

Source Traceability Matrix :

Requirement ID ---->	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12
Source												
Client	#	#	#	#		#	#		#	#	#	#
Stakeholders					#		#	#	#			

identifies the sources presence in the requirement

Requirement Traceability Matrix:

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12
R1	D	D	D	D	D				D	D		D
R2												
R3												
R4												
R5												
R6												
R7						D		R				
R8							R					
R9										D	D	
R10											R	

R11 R
R12
If 'ith' row and 'jth' colomn have
D => Dependency then the jth colomn dependent on the ith row
R => Related then the jth colomn related with the ith row

5. USING REQUIREMENTS

5.1. Software Process Model [15],[16],[17]

Our process model is a modified version of Rational Unified Process. It consists of the following phases:

- **Requirement phase**
- **Design and Planning Phase**
- **Implementation and Testing Phase**
- **Deployment Phase**

In Requirements phase we gather all the requirements, analyze and elicit them.

In Design and Planning Phase we identify different features that have to be provided and categorize the requirements into different modules. We also design the database.

In Implementation and Testing Phase, we deviate from the standard RUP process. Here the whole team is divided into small subgroups. These subgroups will code different modules simultaneously. Testing is also done immediately after coding. Subgroups will exchange their work with other subgroups for reviewing. The subgroups involved are merged to form a larger group while integrating the modules. After every such integration testing is done.

In Deployment Phase the fully integrated modules are finally shipped.

We provide the flexibility to make small changes in any previous phases at any point of time.

Why this Process Model:

1. For a project like Payroll Management System, we believe that all the requirements can be collected in the Requirements Phase itself but as it is a new domain for us, if at a later stage we find out that we have missed any Requirement we provide the facility to go back and change the Requirements.
2. Time to delivery is not critical for our project and hence incremental process models will not be suitable for our project.
3. Our project team has 11 members. We want to use our human resources effectively. Hence we decided to identify modules which can be done independently from other so that small subgroups of 3 to 4 members will work simultaneously on different modules.

4. Since we are inexperienced in this kind of work, we provide the facility to make changes in the previous phases should we discover any errors in them at a later stage.

5.2. Project Plan

Please refer to the Microsoft Project file 'Project_Management_Team_12.mpp' attached for Gantt Charts and network diagram.

5.3. Estimation [18 ,[19]

FP Approach

Sigma (F) = 39 (refer Annexure –B for details)

Value Adjusted Functional Points (VAF) = *0.65 + 0.01 * Sigma (F)* = **1.04**

Function Point Count (FP) = UAF * VAF = 123

No. of members in the team = 11 members

LOC per function point in visual basic = 42

Total LOC = FP x LOC per function point in Visual basic

= 5154.24

Kilo LOC = 5.15424

For semi-Detached, *(refer Annexure-B[a] for details)*

a = 3.0, b = 1.12 and d = 0.35

Effort in person months (PM) = a x (Kilo LOC)^b

= 18.8255 person months (~ 19 person months)

No. of members needed = PM / D

Development Time in months (D) = PM / 11

= 1.7114 months (~ 51 days)

Estimation using use-case Points[20]:

The number of actors in the system is identified for the unadjusted actor weights (**UAW**).

(Refer ANNEXURE-B for details of Use-case Estimation)

UAW (Unadjusted actor weights)= 28

UUCW =125

Calculation of UUCP (Unadjusted Use Case Points)

UUCP= UAW+UUCW= 28+125=153

Technical Factors (TEF) = 20

Environmental Factor = 32.5

Technical Complexity factor (TCF) = 0.65+(0.01*TEF)
= 0.65+(0.01*20) = 0.80

Environment Complexity factor (ECF) = 1.4 + (-0.03*Total Factor)

= 1.4 + (-0.03*32.5) = 0.425

Adjusted UCP (AUCP) calculation:

AUCP= UUCP * TCF*ECF

= 153*0.80*0.425

= 52.02

Assuming that number of hours/UCP Productivity Factor (PF) =20

Effort=AUCP*PF

=52.02*20

=1040.4 hours

Assuming Each Person works for 12 hours in a week, the total number of working hours for team of 11 members = 11*12 = 132 hours

So total number of weeks to complete the project = 1040.4/132 = 7.88 weeks

No of months required = 7.88/4 = 1.97 months = 60 days approximately

6. TEST CASES

- If the administrator logs in for the first time; enters the company details and ask for the company details, he/she should be able to see the company name, address, phone number, email and website url(uniform resource locator).
- Before creation of the employee accounts, if the administrator asks for the employee details, it should show 'No employees found'.
- If administrator tries to create an account of an employee that already exists in the system, the system should deny the operation.
- If administrator creates accounts for the employees and ask for the list of employees, he/she must be able to see the employees for whom accounts have been created.
- If administrator enters the employees details (personal, professional, contact and other), he/she must be able to see them and also be able to update them if necessary.
- If administrator deletes an account of an employee, it should not appear in the new listing of employees.
- If an employee logs in, he/she can view only their details. Employee should not be able to update his/her profile.
- If administrator sets the entire initial settings (tax structure, salary ranges, salary structure, provident fund, financial institutions, company calendar, holiday list & weekly holiday, attendance type), he/she must be able to see any of the above mentioned settings.
- The amount for professional tax and provident fund set for the salary structures should be consistent. For example, if the administrator sets higher value of professional tax and provident fund for a salary range of 10,000-12,000 than the salary range of 5000-7000, it should give an error message.
- Administrator should be able to add any new holiday once the list of holidays is defined, i.e. he should be able to update the list of holidays.
- Administrator should be able to update only the future dates of the company calendar. If he/she tries to update the calendar of the past dates, it should give an error message.
- Administrator should be able to update the salary structures, provident fund details, and attendance type if necessary.
- Administrator should be able to add/delete a financial institution to/from the existing list on any working day of the company calendar.

- Any general employee other than the administrator should just be able to view all the initial settings. Employee should not be able to update.
- Administrator should not be able to mark attendance for an employee for a future date.
- Administrator should not be able to add attendance for the future dates and the software should deny such an operation.
- Employee should only be able to view his/her attendance details, but should not be able to update the entries.
- Administrator should be able to create an entry to register the leave taken by the employee. Administrator should be able to make entries for the date of leave, reason for the leave and No. of leaves availed by the employee.
- Administrator should be able to see the leaves employee-wise or date-wise or no. of leaves availed-wise.
- Employee can see his/her leave details, but cannot update them.
- Administrator should be able to create an entry of loan for an employee with details of loan (like Loan ID, issue date of loan, amount that has been granted, interest, type of payment (single payment or installments), premium type and the premium amount in case of installments, start and end months of the loan and the status of loan recovery).
- Administrator should be able to see the loan details date-wise, employee-wise, due amount wise, loan amount wise.
- Employee should be able to see his/her loan details.
- Administrator as well as employee should also be able to see the amount that has been deducted from salary and total due till date.
- If the administrator enters the type of payment as 'lump sum'(single payment), he should not be able to enter anything in 'premium type' and 'premium amount' fields.
- The 'status of loan recovery' when displayed on a date in between the start and end months should show 'No' and on a date after the end-month should display 'Yes'.
- Administrator should be able to add entries for additional earnings for any employee along with remarks if any.
- Administrator should be able to update the entries for 'reason for leaving', 'date of leaving' in the employee profile when an employee leaves a company.
- Employee should be able to see his/her salary, but cannot update.

- Administrator as well as employee should be able to change the password of their account provided he/she types the old password.
- Administrator should be able to create back-up for the database.

7. USER MANUAL

1. Initially, when you run the software for the first time, administrator logs in. The company profile has to be updated. Company profile includes company name, address, phone number, email and website.

2. Administrator creates employee accounts. Employee profiles are to be updated. Employee profile includes personal details, professional details, contact details and other details.

Personal details: Name, Father's Name, Sex, Marital Status, Date of Birth, blood group, caste category, qualification.

Professional Details: Employee reference No., Designation, Occupation, Division, Department, Grade of Pay (Scale A, B, C), Bank Account No., Join Date, Date of Leaving, Reasons for Leaving.

Contact Details: Address – Present & Permanent, Contact – email, phone, mobile

Other Details: PAN No., PF No., login password.

3. Then the initial settings are to be defined.

Tax Structure: Tax structure (Income tax - IT and professional tax - PT) based on the salary has to be defined, i.e. tax amount for each salary range has to be defined.

Salary Structure: Salary Structures that the company has are to be defined.

Provident Fund: Provident Fund based on pay scale (salary range) has to be defined.

Financial institutions: Financial institutions with which the company is dealing or having accounts are to be defined. The details include bank name, bank address and the bank account No. of the company in that bank.

Company Calendar: Company Calendar for a financial year has to be defined.

Holiday list & Weekly Holiday: Holiday list of the company and the weekly holiday has to be defined.

Attendance Type: Attendance type (session-wise or day-wise) has to be defined.

4. Employee attendance can be added depending on the attendance type.

On a particular day, select an employee and then mark the attendance ('G' for general shift, 'N' for night shift, 'O' for Overtime, 'F' for only first session present, 'S' for only second session present, 'A' for absent).

Overtime: The overtime is considered only session-wise and there can be only three sessions in a day. It constitutes to working half of a working day.

5. If an employee takes leave, the date of leave, then the reason for taking the leave, and No. of leaves availed are to be entered.

6. Employee loan details have to be entered. Loan details includes Loan ID, issue date of loan, amount that has been granted, interest, type of payment (lump sum or installments), premium type and the premium amount in case of installments, start and end months of the loan and the status of recovery.

7. Salary: Salary includes basic pay, earnings, deductions and additional earnings. Earnings include bonus, increments, and allowances (like HRA, DA, conveyance and special allowances). Deductions include loan repayments. Additional earnings include any incentives given for the good performance.

Full & final Settlement has to be done when the employee leaves the company. The reason for leaving the company, date of leaving is to be updated.

8. Reports: Once the salary has been calculated, we can generate the following reports.

Monthly reports: Salary sheet, pay slip, bank statement, attended days report, over time, variance report, additional payments, and increments.

Statutory reports: PF reports, annual reports

Additional reports: Loan reports, leave reports, salary certificates, bonus, exgratia, reimbursement

9. Imports / Exports: This is an option that enables the users who are very comfortable with Microsoft Excel and want to stick to it. They can export the data from the software into an excel sheet. Similarly, they can enter the details in excel sheet in specified format and can import it in the software.

10. Security: The details of his / her salary payment or loan details can be seen by the employee. However, he/she is not permitted to view the details of other employees. 'Change password' option is also included so that any valid user of the software can change his/her password.

Database back-up option is also provided. This is done so that the end-user (only administrator) can create a back-up of the entire database and then store it in his/her local hard disk.

8. PROJECT PLAN [21][22][23]

8.1. Outline Plan

We are required to complete this project by the end of this semester. So we planned accordingly and identified the following major milestones

Confirmation of client and project – Tuesday, Jan 8th, 2008

Requirements Gathering – Mon, Jan 28th, 2008

SRS submission – Fri, Feb 22nd, 2008

SRS Re-submission – Fri, March 21st, 2008

Design – Sat, March 22nd, 2008

Development – Sun, April 13th, 2008

Deployment – Fri, April 18th, 2008

Final Report – Fri, April 18th, 2008

8.2. Project Chart

Please refer to the file "Project_Management_team_12.mpp" attached for Gantt chart, WBS, Network Diagram and Milestones.

8.3. Quality Plan

In order to ensure that we generate a high quality product we take the following actions:

Activity	Quality Control Methods
Requirements	• Reviewing the documents. • Verifying with client whether we gathered requirements correctly.
Design	• Following standard procedures • Verifying whether all requirements are covered
Coding	• Following standard coding conventions • Verifying whether all functionalities are implemented
Testing	• Using standard Testing Tools • Reviewing Test cases

8.4. Configuration Management

- We use Microsoft's Visual Source Safe for Configuration Management.
- All Team Members are given access permissions to view and modify files
- Each major task like Project Plan, Coding, etc will have a separate folder associated with it and the documents related to them are kept in those folders
- Each document has a version number associated with it and any major change in the document will lead to a change in the version number

- Backups of all documents are done every fortnight

9. SUPPORTING INFORMATION

9.1. Glossary & Abbreviations

Additional earning:

The performance incentives given by the company which are not a part of regular salary structure constitute additional earnings.

Basic:

A fixed amount of income earned by an employee in a month which decide all the other allowances earned by the employee.

Bonus:

Bonus is a personal benefit given by the organization, as an extra pay to the employees for festivals, and for other special occasions in the company, for example, rise in gross profit of the company.

Conveyance Allowance:

Allowance provided to employees for their travelling expenses to offsite work place or for travelling on official duty, when office transportation is not available.

Dearness Allowance (DA):

When there is a change in the whole sale index of the market, an allowance is provided to the employees to compensate for the above change. DA is given for every six months. Depending on whether the change in the whole sale index is positive or negative, a corresponding increase or decrease in allowance is considered for an employee.

Employee Reference No.:

Employee Reference No. is a unique number given to every employee of the company.

Financial Institutions:

A company maintains a certain amount of deposits with the Financial Institutions for any transactions.

House Rent Allowance (HRA):

House Rent Allowance (HRA) is provided to employees who reside in a rented house. This allowance depends on the basic salary of the employee.

Incentives:

Incentives are employee benefits which are given when an employee's performance is exceptional.

Income Tax (IT):

Tax paid by the employee that is fixed by the Government based on the range of earnings and income of the employee.

Increment:

It is an increase in the salary of the employee which is done periodically (say once in 6 months or 8 months).

Leaves Availed:

These are leaves taken or availed by an employee out of his leaves quota.

Loans:

The amount that an employee avails from the company for purchase or construction of house, purchase of vehicles etc.

Loss of Pay (LOP):

Loss of Pay is a deduction in salary due to an employee taking extra leaves than the maximum allowed.

OB:

Opening Balance

OOD:

On Official Duty (An employee may be at leave or on official duty).

Over Time:

An employee may work more than the requisite period of time on a working day. The hours of extra work in this context corresponds to Over Time (an extra session worked by an employee is considered to be over time here).

PAN:

Personal Account Number

All the tax details of an employee are associated with PAN.

Pay slip:

It is similar to salary sheet but companies send salary details through this report either giving it personally or through mail.

Provident Fund (PF):

A percentage of the basic salary is deducted and maintained in a separate account every month. Normal withdrawal rules do not apply for PF but a facility of temporary withdrawals and permanent

withdrawals is provided to the employees to use the savings in PF. These withdrawals are allowed only after a stipulated period of time and not before that. In case of temporary withdrawals, the employee has to submit the withdrawn amount back to the account. This rule does not apply for permanent withdrawals.

Provident Fund A/C Number:

This account is unique to an employee and contains his/her provident fund savings.

Reimbursement:

Money spent by an employee from his pocket for the company's work is paid back to him on submission of bills and vouchers, this is called Reimbursement. For example, Travel charges for an employee during an official trip are paid to him on submission of bills.

Salary A/c Bank:

Salary is usually given indirectly through a bank account which is maintained with the salary A/c bank.

Salary Sheet:

It contains the overall monthly information of the salary of the specified employee, like number of days worked, earnings and deductions, and net salary. This report will show the summary result of the specified month.

Salary Heads:

Salary is composed of various salary heads all of which contribute to the making of salary. For example BASIC, DA, HRA are some of the salary heads.

SCF:

Salary Calculation from Date

Variance Report:

This report compares any 2 successive months' salary.

9.2. Reference

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[5] Lecture slides [1-25] by Prof. Rakesh Shukla on Feasibility-6.

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[8] http://www.infosystems.eku.edu/loy/cis480/ppt/mod_c/sld044.htm

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[14] Lecture slides[5-32] of Prof. Rakesh Shukla on "Requirements-5"

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[20] Suresh Nageswaran "*Test Effort estimation using use-case points*", published in '*Quality week 2001, San Fransisco, California, USA, 2001*'

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ANNEXURE [A] – RISK ANALYSIS

Definitions of the Risk categories:

Product Size Risk:
Risks associated with the overall size of the software to be built or modified.

Process Risk:
Risks associated with the degree to which the software process has been defined and is followed by the development organization.

Development environment:
Risks associated with the availability and quality of the tools to be used to build the product.

Technology:
Risks associated with the complexity of the system to be built and the "newness" of the technology that is packaged by the system.

Performance risk:
The degree of uncertainty that the product will meet its requirements and be fit for its intended use.

Schedule risk:
The degree of uncertainty that the project schedule will be maintained and that the product will be delivered on time.

Risk Management

Risk Mitigation is the process of reducing risk exposure, either by decreasing the probability of the risk occurring, or by finding ways to reduce the possible impact if it des occur. [2]

A ***Contingency Plan*** is a backup plan for use in case the mitigation strategy is ineffective, or only partially effective. It usually describes emergency measures to be used if the undesirable outcome still occurs despite all attempts to prevent it. [2]

Risk management for top Risks

Insufficient knowledge in C#.NET, ASP .NET, AJAX

Most of our team members do not have prior knowledge in any of .NET technologies. Our client, Mr. Ramesh Patta has asked us to develop the Payroll management system using the .NET technology.

Mitigation: We have formed a core development team, which concentrates mostly on learning these technologies before the development phase. Take sessions for the rest of the team members.

[20th March, 2008]

Members of the core development team are Anil Kishore, Vasavi Kumar, Poornachand, Praveen and Ravi Shankar.

Contingency Plan: Consult senior students who have prior experience in .NET framework. Session by other members having knowledge in ASP.NET

Difficulty in coping with pressure due to other courses

Most of our team members have one or two projects in this semester, other than the Payroll management system. Also, as we are in the sixth semester, there is more pressure due to other courses, which demands the planned schedule to be changed accordingly most often.

Mitigation: We divide ourselves in to subgroups such that members among a subgroup have different amount of time to be spent on other courses, so that they can divide the work more flexibly.

Contingency Plan : Revise the entire schedule for that week and consider dividing the work between subgroups also.

Under estimation of Payroll management project size

According to the output of the "*Effort Estimation"* and from the "*Project plan*" our project can be completed in a semester period. But, from the above risks (Risk #1, Risk #2) and from the experience so far, we get a feeling that this may not be practically correct.

Mitigation: Revise the scope of the project and plan the work far before and discuss with the team about the rough estimate of number of days required, in every team meeting.

Contingency Plan : Prioritize the requirements and work on the basic deliverables and add extra features or modules, if time permits.

Unable to integrate Salary, Leave and Loan modules

We have planned to divide ourselves in to subgroups during the development phase and each subgroup will work on a module by frequently interacting with each other. But, we feel that all of us may not follow a uniform coding style, and this may lead to taking extra time for integrating the modules.

Mitigation: Understand the dependencies properly and follow uniform coding style. Interact more frequently with the team members developing other modules. Follow incremental and modular approach so that less effort is required to change any piece of code.

Contingency Plan: All the subgroups involved in the development should work together and revise the parts where there is inconsistency.

Database server Crash

Our Payroll management system stores entire data in the database. So, if there is a database server crash, then the entire data is lost, which is the top most risk (in terms of the impact).

Mitigation: Investigate the possibility of buying a high performance and more secure database server.

Contingency Plan: A backup option will be provided, by which the data in stored in a Local hard disk and it can be entered if the database crash, which has the lowest probability of occurrence, does occur.

Radical changes to the requirements

Our client, Mr. Ramesh Patta, has asked us to study any existing Payroll management systems, and get most of the requirements. He also gave the format of some of the reports currently being used in *Vertical Softech Markets Pvt. Ltd* once development phase is started, and if the client inputs more requirements, which involves change in the design, then it's a process as well as schedule risk.

Mitigation: Latest version of the SRS has to be delivered to the client for approval from time to time, and proper documentation of any requests for change from the client has to be maintained properly for future reference. Design of the system should be made flexible so that it can be changed quickly and easily and it least affects the development.

Contingency Plan: Redesign the system to meet the new requirements, and change the implementation accordingly.

ANNEXURE [B] – ESTIMATION

Using FP/COCOMO

Type of Component	Count	Component Complexity		
		Low	*Average*	*High*
No. of external Inputs	14	14 x 3	14 x 4	14 x 6
No. of external Outputs	10	10 x 4	10 x 5	10 x 7
No. of external Inquiries	1	1 x 3	1 x 4	1 x 6
No. of internal Logic File	4	4 x 7	4 x 10	4 x 15
No. of external Interface Files	1	1 x 5	1 x 7	1 x 10
Unadjusted Function Points (UAF) =		*254*		

Does the system require reliable backup and recovery?	4
Are data communications required?	2
Are there distributed processing functions?	2
Is performance critical?	3
Will the system run in an existing, heavily utilized operational environment?	4
Does the system require on-line data entry?	4
Does the on-line data entry require the input transaction to be built over multiple screens or operations ?	1
Are the master files updated on-line?	2
Are the inputs, outputs, files, or inquiries complex?	3
Is the internal processing complex?	3

[20th March, 2008]

Is the code designed to be reusable?	3
Are conversion and installation included in the design?	3
Is the system designed for multiple installations in different organizations?	2
Is the application designed to facilitate change and ease of use by the user?	4
Sum of general system characteristics = Sigma (F)	**39**

[a] Why semi-detached ?

From our requirements, we find that we have the following components in our system :

1) Data entry
   (Details of employees, salary structures, PF percentages, Tax structure, attendance entries, leave entries, company calendar entries)

2) Data update
   (updating details of employees, salary structures, PF percentages, Tax structure, attendance entries, leave entries, company calendar entries)

3) Data query
   (Employee details, employee loan details, employee leave details)

4) Report Generation
   (Pay-slip, Bank statement, monthly attendance report, over time report, loan details, bonus and performance incentives report)

All the members in our project team are inexperienced. The payroll system as a whole is not that complex and at the same time it is not that easy. Considering these characteristics, our project best fits as “Semi-Detached” project type.

Using Use-case point approach

The number of actors in the system is identified for the unadjusted actor weights (**UAW**).

UAW (Unadjusted actor weights)

ACTOR	Number of Use Cases	Factor	UAW
Employee	6	2	4
Administrator(Managerial)	16	1	8
Administrator(Technical)	3	3	6

Total= 28

UUCW calculation (Legends Simple-S; Average-A; Complex-C)

USE CASE	TYPE	FACTOR
Login	S	5
View Salary	S	5
View Attendance	S	5
View Employees Details	S	5
View Holiday List	S	5
View Loans	S	5
Update Employee details	S	5
Update Holiday list	S	5
Update Salary structure	S	5
Update Salaries	S	5
Update loan details	S	5
Update Attendance	S	5
View salary sheet	A	5

report		
View Attended days report	A	5
View overtime report	A	5
View additional payments report	A	5
View increments	A	5
View PF reports	A	5
View annual reports	A	5
View loan reports	A	5
View leave reports	A	5
Generate payslip	A	5
Administer users	A	5
Grant permissions	A	5
Configure software	A	5

Total=125

Calculation of UUCP (Unadjusted Use Case Points)

UUCP= UAW+UUCW= 28+125=153

Technical Factors (TEF):

This calculation takes into provision overall complexity of the project and the expertise of the staffs involved.

Technical factor Number	Description of the factor	Weight	Complexity	Calculated factor(weight * complexity)
T1	Distributed System	2	0	0
T2	Performance	1	2	2
T3	End user efficiency	1	2	2

T4	Complex Internal Processing	1	1	1
T5	Reusability	1	2	2
T6	Easy to install	0.5	2	1
T7	Easy to use	0.5	2	1
T8	Portable	1	2	2
T9	Easy to change	1	3	3
T10	Concurrent	1	2	2
T11	Special security features	1	2	2
T12	Provides direct access to third parties	1	2	2
T13	Special user training facilities are required	1	0	0
			TOTAL	20

Environmental Factor:

Environmental Factor	Description	Weight	Impact	Calculated Factor(Weight*Impact)
E1	Application Experience	0.5	3	1.5
E2	Object Oriented Experience	1	5	5
E3	Motivation	1	5	5
E4	Part Time Workers	-1	0	0
E5	Lead Analyst Capability	0.5	2	1
E6	Stable requirements	2	5	10
E7	Difficult Programming Language	2	5	10
			Total:	**32.5**

Technical Complexity factor (TCF) = 0.65+(0.01*TEF)
= 0.65+(0.01*20) = 0.80

Environment Complexity factor (ECF) = 1.4 + (-0.03*Total Factor)

= 1.4 + (-0.03*32.5) = 0.425

Adjusted UCP (AUCP) calculation:

AUCP= UUCP * TCF*ECF

= 153*0.80*0.425

= 52.02

Assuming that number of hours/UCP Productivity Factor (PF) =20

Effort=AUCP*PF

=52.02*20

=1040.4 hours

Assuming Each Person works for 12 hours in a week, the total number of working hours for team of 11 members = 11*12 = 132 hours

So total number of weeks to complete the project = 1040.4/132 = 7.88 weeks

No of months required = 7.88/4 = 1.97 months = 60 days approximately