Project Specification Form

## Section A:

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| **Name :** | Dilip M Kumar |
| **Student ID :** | PT1081112 |
| **Project Title :** | *College Accountant* – a college accounting software |
| **Supervisor :** | Ms. Priyanka Sachdeva |

## Section B: Brief description on project background

### Problem Context and Description of problem area

In the present scenario, there is no link between any of the management systems of the college. College uses Tally for accounting purposes. There is a constant growth in the amount of data. Also, there is also lot of wastage of resources. Poor security measures add up to the problems of the current system. Data can’t be checked for accuracy and concurrency.

The problems being faced in the current system are:

* Use of expensive accounting software: TALLY is being presently used for managing the accounts in the college. Tally is an ERP and is feature-rich software. However, most of the features are not required in the current environment. And it costs a bomb to include additional features into the previously procured software.
* Experienced required users to operate system: Tally being complex software to handle needs to be operated by only experienced users. Prior training is required to exploit the full potential of this software. This makes the software less user friendly.
* Security: the current system provides very less security measures. Since, the system deals with money it is very important to make the system secure.
* Waste of resources: the current system leads to wastage of many resources. Lot of wastage of paper in printing of receipts etc. Wastage of time and energy of students when students have to pay library fines. They first need to get a receipt from the librarian, then pay the fine at accounts and then go back to library to verify further details.
* Data accuracy and concurrency: there are no measures to check if the data entered is correct or not. The system doesn’t check for ambiguous data. Since there is no linking between modules. Also, there are no measures to check for data concurrency.
* System upgrades: upgrading of the system is a costly affair. And it is important to keep the software updated with current times.

### Rationale

There are various problems associated with the current system which have been identified earlier. To resolve these problems the proposed system is *College Accountant*.

*Tangible Benefits:* which the proposed system provides are as follows-

* Data is stored and managed in a more proper manner.
* Less wastage of paper.
* Easier to search records
* Transparent transactions to college accounts

*In-Tangible Benefits:* which the proposed system provides are as follows-

* Lot of time can be saved
* Reports generated can help in better management of the college funds
* Less human effort and errors
* Guarantees user satisfaction
* User friendly – very less training to be imparted for users

### Target Audience

The primary uses of this system would be:

* Accountant and
* Students

Indirectly the system would be used by:

* Librarian,
* Examination Controller,
* Hostel In-charge,
* Store In-charge,
* Bus In-charge,
* Faculties and Staff,
* Mess and Café in-charge,
* Director,
* College Management.

### Nature of challenge

This accounting software includes various modules of the college system, hence is considered an ERP. And it is a well-known fact that developing an ERP is in itself a herculean task. However the various challenges in developing the system would be:

* Collection of data: Since more than ten modules are being integrated into this system, hence a lot of useful data needs to be collected. The data needs to be analysed and checked for accuracy.
* Integrating the Modules: all these modules need to be made compatible and integrated properly with the system.
* Payment Gateway: a payment gateway is being provided for the students to pay up their fees/fines. Developing and implementing this gateway would be a great challenge.
* Report Generation: extensive graphical reports are to be generated. For this the data collected need to be made compatible and used to generate the reports.
* Understand Account-keeping: being from a science background, we have very less knowledge of Account-keeping and hence the developer needs to study about this in detail.
* Programming Language: gaining master of the Programming language [Java in this case] in order to develop all the functionalities.
* User-friendly: making the system as user friendly as possible. Designing the system by keeping in mind the various kinds of users [Novice, expert, casual].

## Section C: Brief description of project objectives

## Scope of Proposal

This system ‘*COLLEGE ACCOUNTANT*’ is being exclusively developed for colleges/ universities/ institutes. It is an all-round software solution for managing the accounts of the college. This would be an online as well as a desktop based application. The online version of the system provides a gateway for the students to pay the tuition fees, examination fees, library fines, late fee fines, re-examination fees etc. Along with these students can view the previous transaction history. Also, students who have to obtain any refunds from the college can apply for the same. The desktop application is mainly to be used by the accountant. The system would very well integrate the payroll system for the faculties and other staffs of the college. The examination fee-fine, library, bus, hostel, mess, cafeteria, bill payment, inventory and store modules are also being integrated to this system. Notifications in the form of SMS and email are being provided. Graphical reports can be generated on the flick of a button. These reports help the management to take better decisions.

## Deliverables

The developer has distributed whole project in various modules each under as core, enhanced and special functionality:

### *Core Functions*

* *Student Fee Module:* In this module the fee to be submitted by a student corresponding to the year and semester they are studying is calculated. The system checks if other fees like registration, counselling, convocation, is paid or not. It also checks for any applicable scholarships, concessions etc. Late fee fine is calculated according to the fine slabs.
* *Payroll Management:* this module deals with the payment of salary of the staff and faculties of the college. The system calculates the amount of days worked to arrive at the salary to be given. If any bonuses or deductions are applicable they are adjusted to the above calculated salary. The salaries are deposited directly into the accounts of the staff and faculties.
* *Library Module:* this module calculates for the fine to be paid by the students for the books issued. Fine could be either late book return or misplaced/damaged books. Also, it helps in keeping a check on the books which are being ordered as new or as replacement or due to shortage.
* *Inventory/ Store / Departmental:* this module keeps a check on the items which are being ordered for the store. Items could be like sports equipment, furniture, markers, dusters, cleaning equipment, gardening equipment etc. Also keep a check on the items which are being sold off. To check for the rent payment to be received from the departmental store owner.
* *Examination Module:* this module checks for the attendance of the students. If a student has low attendance then he/she will have to pay the calculated amount to sit for extra class to recover for the classes which have been missed. This module also checks for the performance of the students. If a student fails in the internal or external then the required payment has to be paid by the student for sitting in the exams.

### *Enhanced Functions*

* *Hostel Module:* this module checks for the payment received by students in respect of the hostel chosen by them, ac or non ac rooms, single-double-triple bedrooms etc. It also checks for the miscellaneous expenses of the hostel like laundry, newspaper, damaged goods replacement etc.
* *Bus Module:* this module keeps track of all the payments which have been received in respect of the bus services provided to the students and faculties. It also covers the fuel and maintenance charges of the buses.
* *Maintenance and Development:* this module calculates the expenses of the college in terms of building maintenance and improving the present infrastructure.

* *Mess /Cafeteria Module:* this module checks for the mess fee payment by student and faculties. Total charges to be calculated for those who avail the mess facilities occasionally. To check for the rent payment to be received from the mess and cafeteria owners.
* *Bill Payments:* this module checks for the payment the college has to do to keep various third-party services active. These services include the payment for the ISP provider, security, electricity, water, etc.
* *Notifications / History:* SMS / email notifications can be sent to the defaulters. Reminders can be sent beforehand so that students can pay the fees in time. Notifications can be sent to the staff and faculties on successful transfer of the salaries to their accounts. The whole account history of the students can be viewed in a glance.

### *Special Functions*

* *Graphical Reports/Receipt Generator*

Weekly/Monthly/Yearly reports can be generated showing the income and expenses of the college. These reports would be of importance to the management of the college which could help them further in the better managing of the college funds. These reports can be generated graphically for better understanding. Receipts could be printed for future references.

* *Payment Gateway:* would be developed so that students can easily pay the fees online at any time. They can pay the fees by credit card, net banking etc. and can pay the college fees, fines, or other charges which needs to be paid to the college. This is more secure method and payments can be easily tracked.

## Evidence of Limiting the Project Scope

Maximum effort would be utilized in developing all the key features of the system, still some functionality may remain unfulfilled, such as:

* Authentication: since different modules are integrated with each other various authentications would be required before accessing the database. And to work on actual data would be risky; hence the system would use dummy databases to show the working.
* Payment gateway: the gateway would be developed in PHP or ASP.net and not in Java [as the other system]. Since it takes a lot of money to configure a server for JSP.

## Other Learning Objectives

The concepts and ideas in lieu of the trained skills which would be required in the development of the project:

* Encryption and decryption for password and other types of protection
* Hibernate to make secure database
* Having thorough knowledge of Tally ERP
* Study other ERP systems
* Research more about Payment gateway

## Section D: Brief description of resources needed by the proposal

### Hardware Resources

The hardware resources which would be required for the proper functioning of this system would be:

* Desktop Computer/Laptop
* Processor : Core2 Duo, Dual Core, Core i3,Core i5, Core i7 equivalent or above
* Memory : 2GB RAM or more
* Hard-drive: 100GB or more [approx.. 100MB to install application]
* Monitor Resolution : 1024 x 768 or Higher [Graphic card not required]
* Server: for hosting the website part of the project.
* Modem: [wired/wireless] for seamless Internet connection
* All-in-One Printer: Copier-Scanner-Printer [Fax optional]
* Ergonomic Keyboard and Mouse

### Software Resource

The software resources required for the successful development of this project are as follows:

* OS : Windows 98 / 2000 / ME / XP / Server 2003 / Vista / Server 2008 / Windows 7 / Windows 8 / Server 2012
* IDE : Net Beans , Microsoft Visual Studio
* Database : MySQL
* Documentation: Microsoft Office Word, Microsoft Visio, Microsoft Power-point, Microsoft Office Project, Adobe reader etc.

### *Access to Information/Expertise*

For the development of any project, the foremost task is to collect the data which would be used by the system. And this data can be collected from the users of the system, experts of that particular field, studying other similar systems, books and other internet resources. To collect data from users/experts the best data gathering method would be to conduct interviews and fill-up questionnaires from:

* Accountants: they are the primary users of the system and have the exact knowledge of the problems in the current system and their expectations from the proposed system. Also, they are clear about the data and the functionalities which the system would need to fulfil the user needs. The data which can be collected can be: payroll of employees, student fees, bill payments etc.
* Librarian: can help in providing the book details and how the fine is calculated for overdue/damaged/lost books. This data can help the students pay up the fines in time and make the transactions transparent.
* Examination Controller: can provide the data about how the re-examination fee needs to be calculated.
* Store In-charge: can provide data about the things which are being procured for the college; the actual cost, monthly costs, maintenance costs etc.
* Bus In-charge: can provide the data bout the bus details, daily kilometres run details, diesel/petrol consumption, maintenance and servicing charges etc.
* Mess/Café In-charge: can provide the data about the rent being paid by them to work on college grounds, electricity consumption etc.

Other reliable resources for data gathering:

* Reference Books
* Internet : only research materials [forums and blogs to be avoided]
* E-books

### *User Involvement*

In –course of the development of this project various users would be involved to obtain valuable suggestions and feedbacks from them. Also, some users can be testers of the system and help with the evaluation of the system. The users can be:

* Accountants : primary users [can also help in testing]
* Students : Primary users [can also help in testing]
* Librarian
* Faculties and other Staff
* Store In-charge
* Examination In-charge
* Hostel Wardens
* Bus In-charge
* Mess and Café In-charge
* Supervisors/Advisors

## Section E: Academic research being carried out and other information, techniques being learnt

## Academic/Theoretical Research Areas

The academic research area for developing the proposed system would be:

* *Tally:* since this project is the development of accounting software, a thorough research has to be done of the other similar software in the market. And among these Tally is the most popular accounting software.
* *Account-keeping*: the developer comes from a Science [computers] background; he/she would need to study deeply about how accounts are managed.
* *Payment Gateway*: is one of the special features being implemented in the project. However, thorough research has to be done in this context to implement this in the project in the most suitable way.

## Technical/Programming Research Areas

* Java: The desktop application would be developed using Core Java and the payment gateway is being proposed to be designed in JSP.
* Net Beans: is the IDE [integrated development environment] in which the application would be designed
* MySQL: is the database for this proposed system
* Hibernate: is concept of securing the database
* Encryption & Decryption: these would be used in order to make the data more secure and confidential.

## Information and Resources

### Books:

* Bert Bates, Kathy Sierra (2003). *Head First Java*. 2nd ed. O'Reilly Media.
* Katherine Sierra, Bert Bates (2008). *SCJP Sun Certified Programmer for Java 6 Exam 310-065*. Tata McGraw - Hill Education.
* Santosh Kumar K., Kogent Solutions (2008). *JDBC, Servlets, And JSP Black Book*. Dreamtech Press.
* Chris Zeis, Chris Ruel, Michael Wessler (2009). *Oracle 11G For Dummies*. Wiley India Pvt Ltd.
* Santosh Kumar K. (2013). *Spring and Hibernate.* 2nd ed. Tata McGraw - Hill Education.

### Internet Resources:

* Srinivas Kalabarigi. (2013). *Encrypt and Decrypt data.* Available: http://www.codeproject.com/Tips/635973/Encrypt-and-Decrypt-data. Last accessed 20 September 2013.
* (2013). *Learn Tally.ERP 9.* Available: http://www.tallysolutions.com/website/html/services/learning-tallyerp9.php. Last accessed 10 September 2013.
* (2012). *Hibernate.* Available: http://www.tutorialspoint.com/hibernate/. Last accessed 12 September 2013.

### Human Resources

* Accountants : primary users [can also help in testing]
* Students : Primary users [can also help in testing]
* Librarian
* Faculties and other Staff
* Store In-charge
* Examination In-charge
* Hostel Wardens
* Bus In-charge
* Mess and Café In-charge
* Supervisors/Advisors

## Real World Methods and Practices

Methods and practices used in the real world can be useful and effective in researches, in order to carry out the research required for this project are:

* *Interviews:* since the maximum data needs to be collected from the Accountant, there would be a face-face interview with him/her. The interview conducted would be informal with a range of open-ended questions.
* *Questionnaires*: would be distributed to those users of the system who are not directly using this system, like librarian, examination controller etc. The questionnaire would be of paper-pencil type with a range of bounded questions.
* *Competitive Analysis*: similar systems would be searched and thoroughly studied analyzed for their merits and demerits in-order to provide the proposed system with maximum usable functionalities.

## Section F: Brief description of the development plan for the proposed project

### Software Methodology

Since the proposed system integrates various modules of the college, it is considered to be an ERP. Best suited methodology for the development of this system could be the **Spiral Model.**

Spiral Model arranges the various and tasks and activities in loops. The loops represent development phases and for a project there can be any number of loops. It is an iterative model which inculcates into it the features of both the *Waterfall Model* and *Prototype Model,* hence eliminating the demerits of these models and including good features into it. The development of the software takes place in a systematic order [waterfall] over the loops and prototypes are developed and shown to end-users for evaluation [prototype] at end of a phase. This ensures complete user satisfaction and also reduces risk of project failure. This model shows special emphasis on Risk Analysis.

#### Reason for choosing Spiral Model

Developing an ERP is a huge task and involves lot of time and money.

* A spiral model is usually applied on large and mission-critical projects, hence best suited for this proposed system which in itself is large with time and budget constraints.
* The spiral model lays special emphasis on Risk Management. Hence there is a very high chance of reducing the risk of project failure. This is necessary since this project is vast and costly, and any failure will lead to huge losses.
* ERP system demands for strong documentation and approval control which are well covered by this modelling technique.
* The project estimations like cost, schedule and other resources become more realistic with the progress of the project through the loops of this model.
* Since a prototype is developed after the end of each phase, it ensures maximum user satisfaction and helps in the proper management of the project.
* Additional functionalities can be added at a later stage which in turn helps in the development of a highly customizable project which is the need of the hour.

### Phases of Spiral Model

* Planning: this phase deals in studying the project objectives, alternatives in design and constraints imposed because of cost, technology, schedule, etc.
* Risk Analysis: in this phase other approaches are studies which can be implemented in order to fulfil the identified constraints. Operational and technical issues are addressed here. Risk mitigation is in focus in this phase. And evaluation of all these factors determines future action.
* Engineering: in this phase the planned product is developed. Testing is also done. In order to do development, waterfall or incremental approach can be implemented.
* Evaluation: in this phase the progress is reviewed and judged considering all parameters. Issues which need to be resolved are identified in this phase and necessary steps are taken.

### Hardest Tasks

The most hardest and challenging portion of the development plan would be:

* Research and Planning: the proposed system is vast since many modules need to be integrated and hence a lot of data needs to collect in this relation. Even proper planning needs to be done about how to go about developing this system.
* Implementation: after development of this software it would be another herculean task to implement this project. All the modules would have to be made to work in sync with each other. Also, basic training needs to be imparted to the end users.
* Presentation: this is the most crucial and hardest part of any project. A proper and convincing presentation needs to be prepared for the customer. The developer needs to convince the customer through his/her presentation that the system which has been developed is the system which the customer wished for.

## Development Plan

The order in which the task would be accomplished:

Start Date: 13 September 2013

Duration: 33 weeks

End Date: 17 April 2014

1. Planning : 8 weeks
2. Risk Analysis : 8 weeks
3. Engineering : 15 weeks
4. Evaluation : 2 weeks

## Section G: Brief description of the evaluation and test plan for the proposed project

## Test Plan Strategies

The test plan strategies used in this project will be:

* *Unit and Integration Testing* – This system will be developed in different modules or units, based on these units, testing are done individually, once the modules are tested, they are been integrated for the integration testing. These testing will be performed by the developer himself.
* *Black-box testing* - allows the tester to interact with the system to assess the test results, through this testing, user get to know what the system is supposed to do, but not how it is done.
* *White-box testing* – this type of testing allows the user to access the system along with its inner codes. This will help the user to know the system deeply and can better understand the inner functionality or working of the system. This test will be performed by a supervisor. The supervisor will be giving evaluation based on the runtime effectiveness and efficiency of the system codes, in order to produce a better performance.
* *Alpha Testing* – this testing will be carried out to if all the functionalities in the project are working according to user’s need or not. This testing is done to know whether the system is acceptable to end-user or not. The tester will be carrying this testing by presenting real data to know actual input and output of the system. Later on he can give comments on the user-friendliness of the system.

To accomplish the mentioned testing strategies, these types of testing are to be applied:

* *Usability Testing* –it will test the usability of the system. It basically considers the user interface design, familiarity, user acceptance and how the system recovers from an error. Tester: End user, supervisor. Data sets: 3
* *Functionality Testing* – Functions featured in the system will be tested thoroughly to ensure that it is working properly. Tester: Developer, supervisor, end user. Data sets: 3
* *Compatibility Testing* – The system will be tested on different operating systems and software. Tester: Developer, end user. Data sets: 3
* *Runtime Testing* – System loading times, execution problems and other runtime issues are to be tested. Tester: Developer, end user. Data sets: 3
* *Configuration Testing* – The system will be tested using different hardware configurations. Tester: Developer, end user. Data sets: 3

## Evaluation on Success Criteria

To evaluate on how successful a project is, these criteria are considered:

* *Meeting user requirements* – A project which can fulfil all the requirements and expectations of all users is called a successful project. Evaluator: End users
* *Functionality* – Functionality is determined by the working of the system. The system functionality such as in traction of different module is working or not, report generated or not. Evaluator: End users, Developer
* *Usability* – Elements such as user acceptance, accessibility, familiarity and recoverability will be evaluated here. Evaluator: End users
* *Level of Content* – it shows how well the information and content is available in the system and how much deep the contents are. Evaluator: End users
* *Research and Analysis* – A good amount of well investigated research and analysis work is important to the success of a project. Evaluator: Supervisor
* *Documentation* – The ability to come up with a documentation which is very well formatted and good English and grammars are used. Evaluator: End User