

Case Study on College Payroll System

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I. Introduction

Data Flow diagram is a graphical aid for defining system inputs, processes and outputs. It represents flow of data through the system.

The DFD's are used in modern methods of system analysis. They are simple to the extent that the types of symbol & rules are very few. DFDs serve 2 purposes:

1. Provide a graphic tool which can be used by the analyst to explain his understanding of the system to the user.
2. They can be readily converted into a structured chart which can be used in design.

“The DFD is a flower which unfolds the story of a system petal by petal”

Case Explanation

The college of commerce is a medium scale organization of about 110 employees working as senior college teachers. The college authorities wanted to computerize the pay roll system. The management works with finances as per the guidelines given by the regulations. The management plans for future is to automate payroll system. They follow a hierarchical structure and adhere to the rules and regulations laid down by the management.

The administrative staff with very little knowledge of computers is involved in low level data entry work. They are mostly busy dealing with student's data entry & details. The main focus is on students. At the end of every month the calculations for staff payroll are mandatory. The payroll is a large part of the workload and involves many senior members of staff for manual work. The top level management is involved in reviewing the reports generated for better financial management.

A college payroll system, handles different financial transactions as students & staff are main data sources. In this case study, focus is on staff salary system. For this system, attendance & leave record with leave summary, payroll register with pay slip, salary summary book, bank statements & deduction reports are mandatory.

The payroll system involves preparation of attendance & leave statements, in which attendance, leave records & leave summary needs to be updated. By using current payroll, if necessary consider deduction summary & arrears data. The accounts department prepare bank statement & deduction reports.

The payroll system must go through various processes for its completion. However, these processes are not mandatory as a job or task may need different processing. The various processes are:

- Prepare attendance & leave statement
- Prepare payroll Register
- Prepare bank statements & Deduction Report

Firstly employee leave summary report need to be prepared. In this report generation, verify the muster for leave record & its sanctioning.

At the completion of the current pay calculations, pay register & pay slips need to print. Then the salary summary book is prepared. The accounts department calculates arrears with dues details.

Summary of transactions as well as reports related to the payroll system, are sent to the University Office as per requirement.

Understanding the current system:

The college under consideration is a very old college set up to cater to the specific needs of the university. Employees of this college have worked on paper and pen concept & manual calculations for payroll. As advancement in the technology, employees want to reduce the burden of manual calculations.

Faults with the existing system

1. The existing system is heavily dependent on the manual work for calculations.

2. The data & records required for calculation & report generation is very complex. Every month handling calculations manually is very tedious & time consuming task. For each employee different parameters & calculations need to be done.

3. Large amount of paperwork.

Maintenance of different registers like leave records file, current payroll file, attendance file, deductions, arrears and salary register, is required in the existing system. Any query from the departments requires the user to refer several registers.

Purpose of automation

1. Avoid the complicity & time consumption for every month calculations.
2. Improves correctness by analyzing the data.
3. Different reports help to understand monthly profit / Loss ratio.
4. Creating history files.

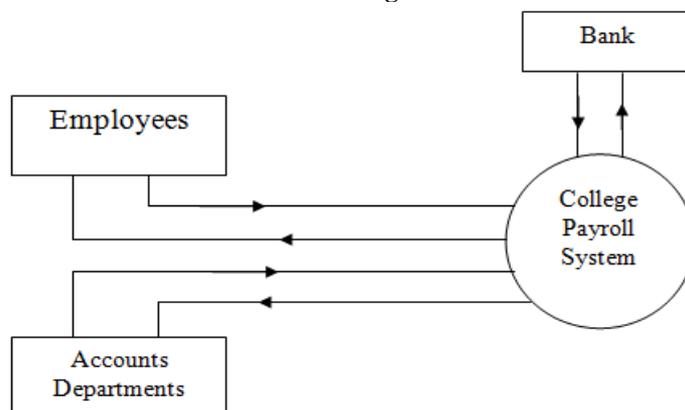
Implementation issues

1. Data inputs.
2. Installation
3. Training to the administrative staff
4. Maintenance

Software Quality considerations

1. Automation of various processes & calculations as per the requirement of administrative staff.
2. The new system should be user friendly and easy to understand as well as provide error recovery and better help as staff is less literate about computers.
3. Expenses must be bearable to the organization.
4. Maintenance will be difficult.

Context Diagram

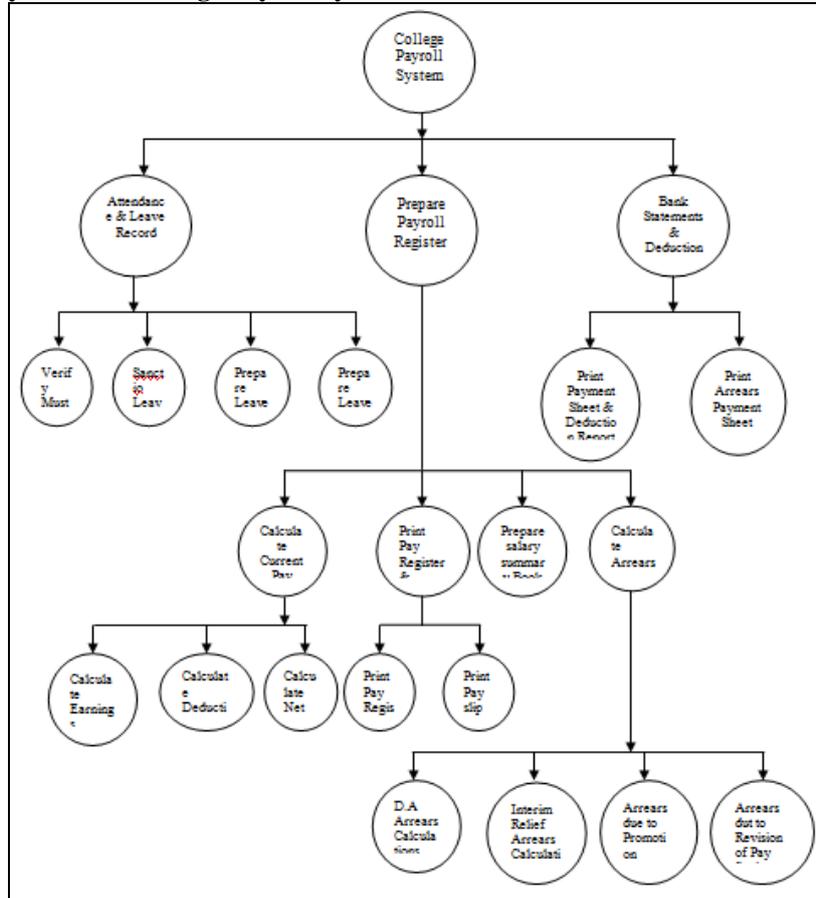


The context diagram clearly determines the boundaries.

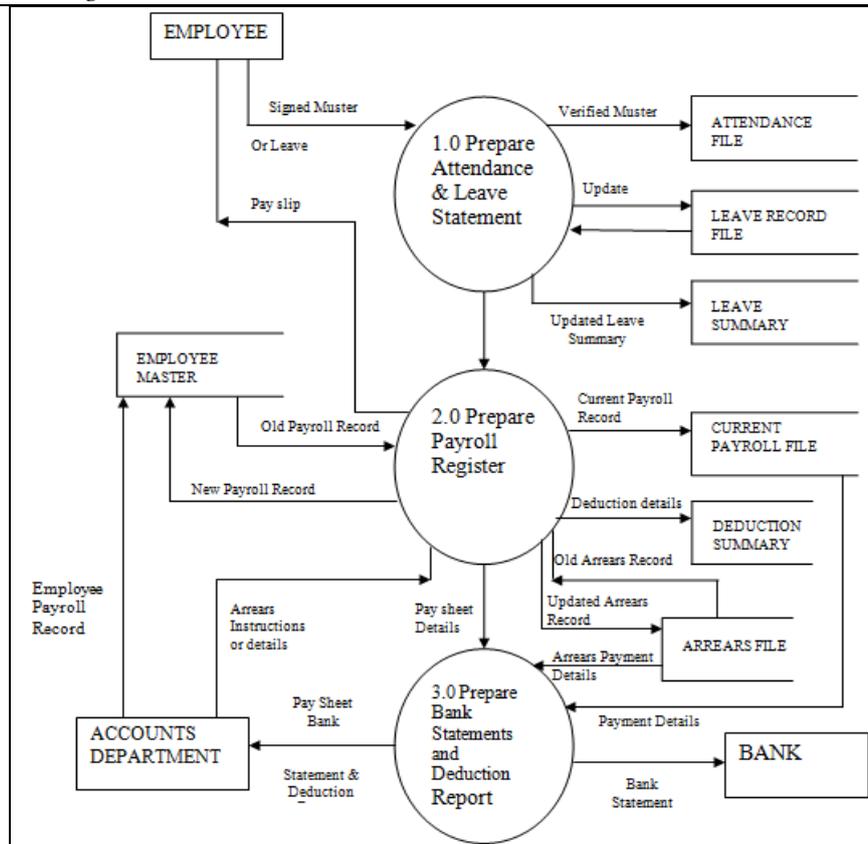
1. The context diagram shows
 - a. All entities like Employees, Accounts Department, and Bank.
 - b. All data entering / leaving the system which is useful for collecting input / output documents.
 - c. Context level diagram contains a single process but it plays a very important role in studying the current system.

The main process given in the context diagram can be exploded in to sub processes which make up the total process. Generally, it is ideal to have process hierarchy chart for the system under consideration.

Process Hierarchy chart for College Payroll System

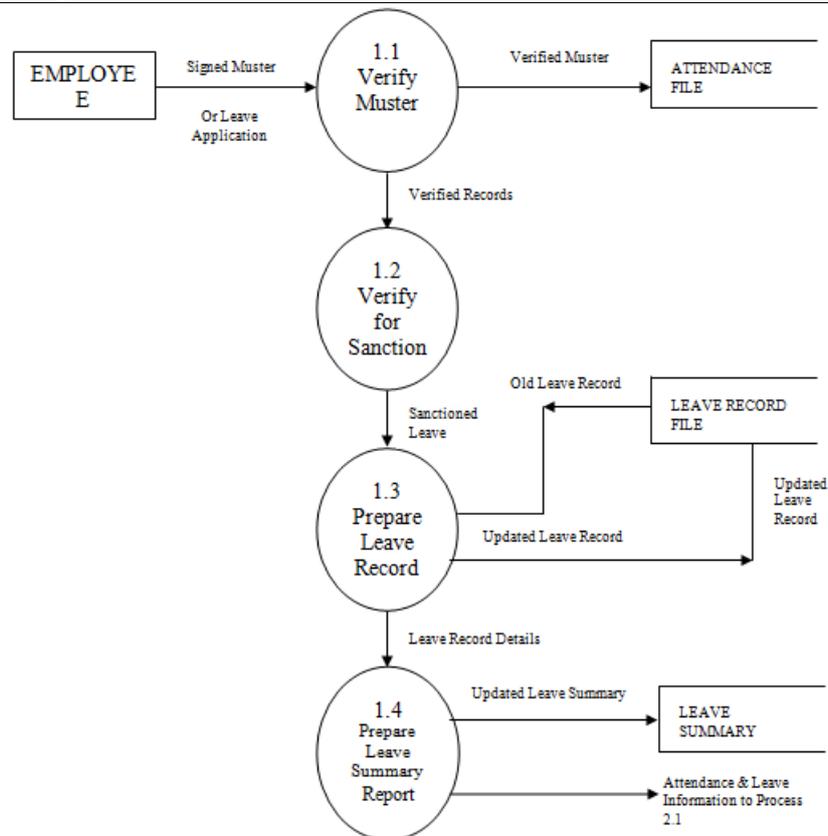


Proposed System: Zero Level DFD



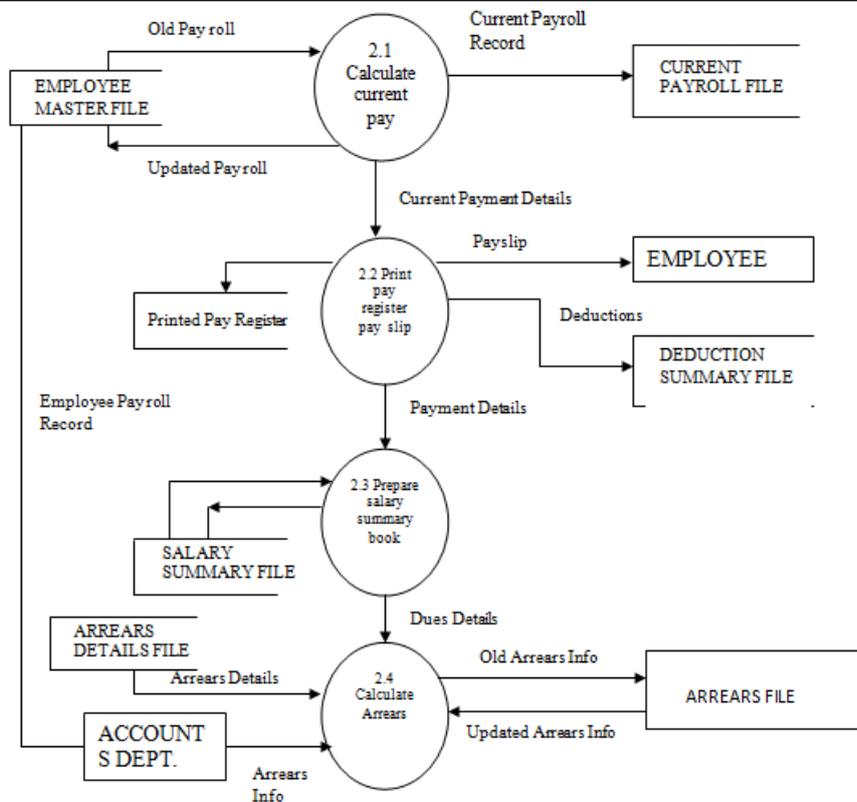
The description of college pay roll system in the context diagram requires more details. Hence the next step is to describe the system at zero level, linking sub processes like prepare attendance and leave record, prepare pay roll register, prepare bank statements & Deduction reports etc.

Existing First Level DFD

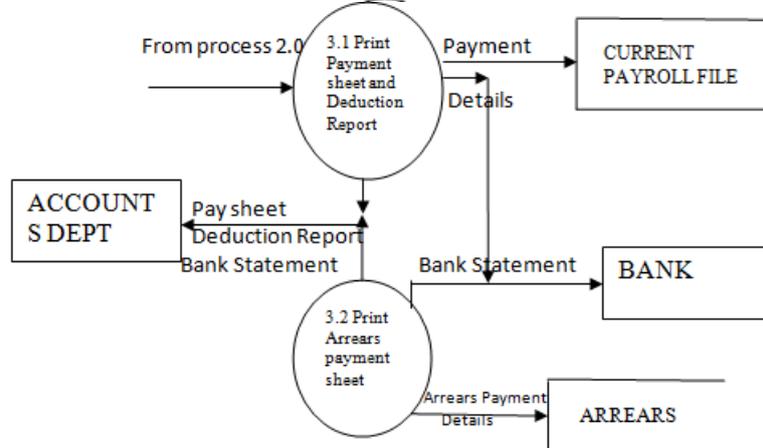


1. Keep the external entities unchanged.
 2. Prepare the list of processes and data stores.
 3. The DFD consists of 3 main processes like prepare attendance & leave statement, prepare payroll register, prepare bank statements & deduction report.
- Final salary / pay sheet will be generated at the end of the process contains information about leave records, arrears, deductions

First Level DFD:



Level -1 DFD for process 2.0



Level -1 DFD for process 3.0

Level -1 DFD for process 3.0

Exploding the processes of the 0 level becomes necessary here. The process ‘Prepare Attendance & Leave Statement’ can be broken into

- 1.1 Verify muster
- 1.2 Verify & sanction Leave
- 1.3 Prepare Leave record
- 1.4 Prepare Leave summary report

Similarly, the process prepare payroll register can be broken into

- 2.1 Calculate Current Pay
- 2.2 Print Pay register & Pay slip
- 2.3 Prepare salary summary Book

2.4 Calculate Arrears

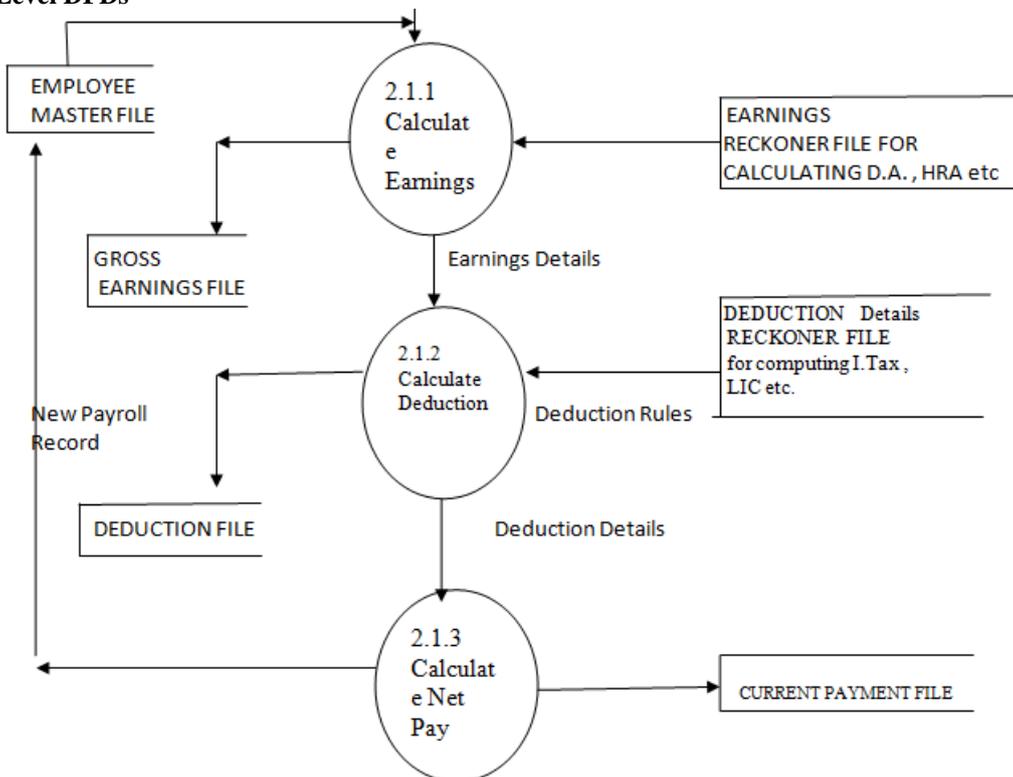
The third process 'Prepare bank Statement and Deduction Report' can be broken into

3.1 Print payment sheet & Deduction report

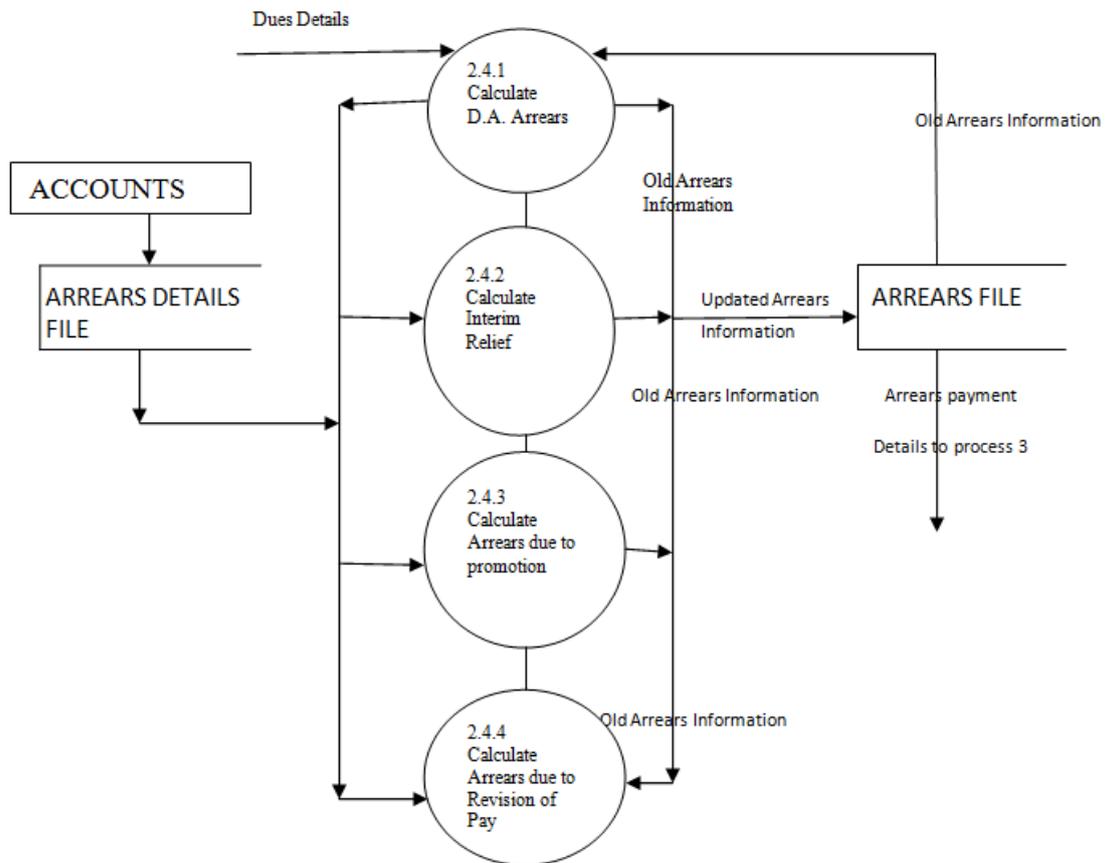
3.2 Prepare arrears Payment sheet

Notice that the sub-process 2.1 can't begin unless the leave record is available. This is necessary because the teacher concerned might have gone on medical leave, long leave etc. Pay has to be adjusted accordingly. Hence the input for 2.1 is attendance & leave information record. The old payroll record from employee master is needed to know the basic pay, DA , HRA, CCA & Deductions. This has to be worked out with current pay roll record to prepare updated pay roll record. The current payment details flows from 2.1 to 2.2 for printing the payroll register & pay slip. A deduction summary file is prepared to consolidate & send the accrued amounts to various agencies like P.F. Office, L.I.C., Income tax department & so on. In sub process 2.3, a salary summary book is prepared to account for the Government grants utilized. The Dues details from sub process 2.3 to 2.4 is needed because there is there is time gap between actual implementation and receipt of grants from government in respect of Interim relief , DA Increase , arrears arising out of promotion to higher grades etc. Hence, an Arrears File is maintained and money is deposited in the bank account as and when the funds are available. Similar analysis can be done for Level 1 DFD to the process 1 and 3.

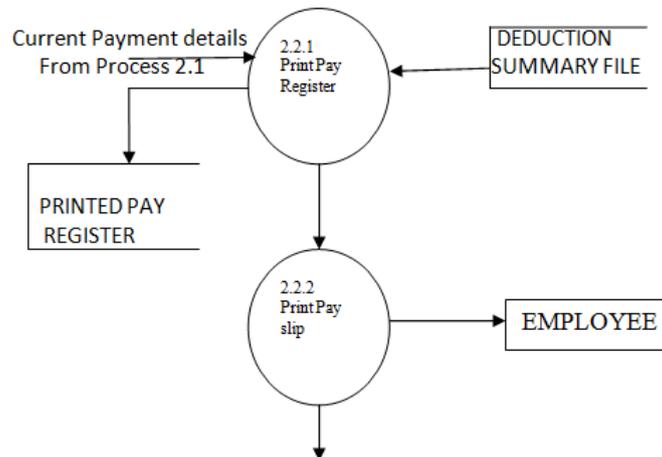
Second Level DFDs



Level – 2 DFD for process 2.1



Level - 2 DFD for process 2.4



Level -2 DFD for process 2.2

The second level DFD is required for sub processes 2.1, .2.2 and 2.4 only. The sub process calculates current pay can be exploded into calculate current earning:

- 2.1.1)** Calculate Earnings
- 2.1.2)** Calculate Deductions
- 2.1.3)** Calculate Net pay

A similar record level explosion is done for process 2.2 and 2.4.