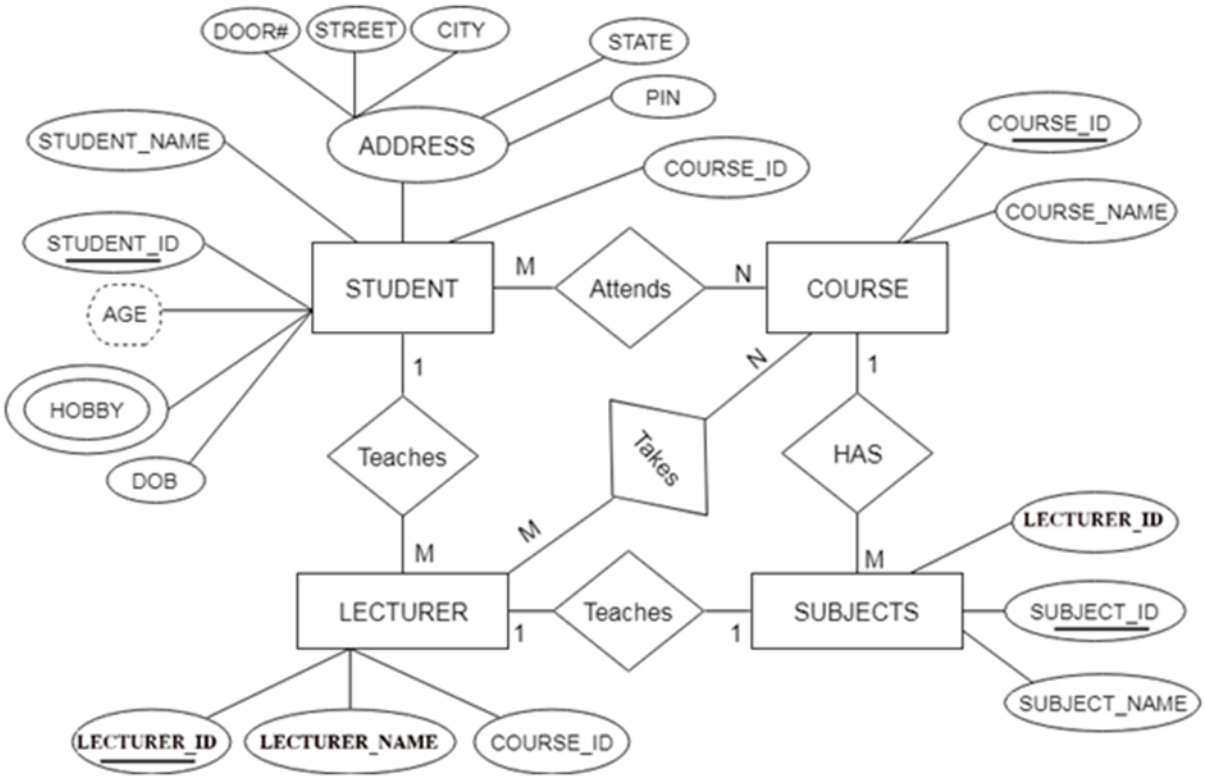
LAB EXPERIMENTS-SOFTWARE ENGINEERING

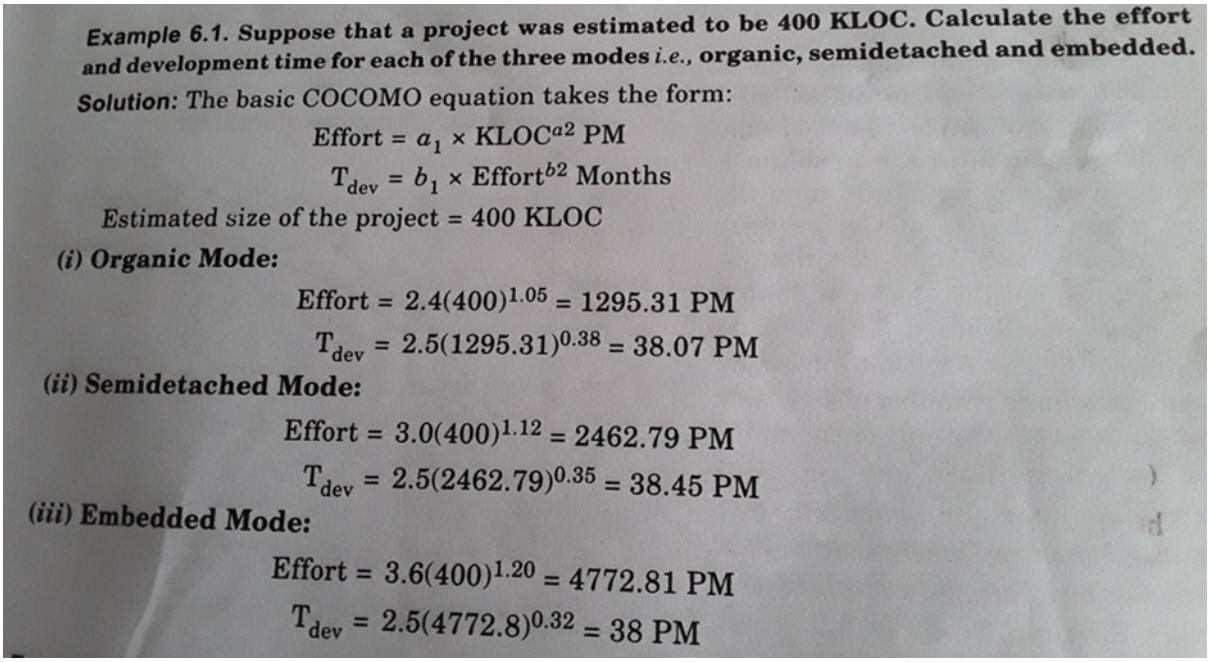
NOTE: BEFORE WRITING ANY EXPERIMENT PLEASE WRITE A SHORT NOTE ABOUT THE TOPIC

Experiment: Draw an ER Diagram for course management system.



Experiment: COCOMO MODEL

Example 6.1. Suppose that a project was estimated to be 400 KLOC. Calculate the effort and development time for each of the three modes *i.e.*, organic, semidetached and embedded.



Example 6.1. **Suppose that a project was estimated to be 400 KLOC. Calculate the effort and development time for each of the three modes *i.e.*, organic, semidetached and embedded.**

Solution: The basic COCOMO equation takes the form:

$$\text{Effort} = a_1 \times \text{KLOC}^{a2}\ \text{PM}$$

$$T_{dev} = b_1 \times \text{Effort}^{b2}\ \text{Months}$$

Estimated size of the project = 400 KLOC

(i) Organic Mode:

$$\text{Effort} = 2.4(400)^{1.05} = 1295.31\ \text{PM}$$

$$T_{dev} = 2.5(1295.31)^{0.38} = 38.07\ \text{PM}$$

(ii) Semidetached Mode:

$$\text{Effort} = 3.0(400)^{1.12} = 2462.79\ \text{PM}$$

$$T_{dev} = 2.5(2462.79)^{0.35} = 38.45\ \text{PM}$$

(iii) Embedded Mode:

$$\text{Effort} = 3.6(400)^{1.20} = 4772.81\ \text{PM}$$

$$T_{dev} = 2.5(4772.8)^{0.32} = 38\ \text{PM}$$

EXPERIMENT: FUNCTION POINT CALCULATION

Question: Given the following values, compute function point when all complexity adjustment factor (CAF) and weighting factors are average. User Input = 50, User Output = 40, User Inquiries = 35, User Files = 6, External Interface = 4.

- UFP = (50*4) + (40*5) + (35*4) + (6*10) + (4*7) = 628

  As complexity adjustment factor is average (given in question), hence let Scale = 3.

- TDI = 14 * 3 = 42

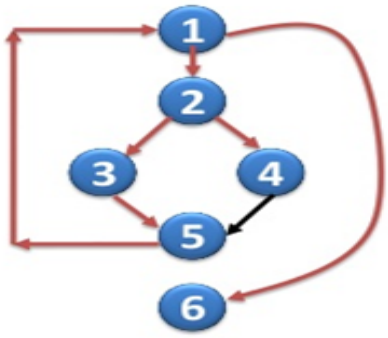
- VAF = (TDI * 0.01) + 0.65=(42*0.01)+0.65=1.07
- FP = VAF * UFP=1.07*628=671.96

EXPERIMENT: CALCULATE MC CABE CYCLOMATIC COMPLEXITY

Ques: Calculate cyclomatic complexity for Euclid's GCD algorithm

EUCLID GCD ALGORITHM

```
int f1(int x, int y){
  while (x != y){
    if (x>y) then
      x=x-y;
    else
      y=y-x;
  }
  return x;
}
```



Ans: V(G)=7-6+2=3

Experiment: reliability model-JELINSKI MORANDA MODEL

Example- 7.7

There are 100 errors estimated to be present in a program. We have experienced 60 errors. Use Jelinski-Moranda model to calculate failure intensity with a given value of ϕ=0.03. What will be failure intensity after the experience of 80 errors?

Solution

N = 100 errors

i = 60 failures

ϕ = 0.03

We know $\lambda(t) = 0.03\,(100 - 60 + 1)$

= 0.03(100-60+1)

= 1.23 failures/CPU hr.

After 80 failures $\lambda(t) = 0.03(100 - 80 + 1)$

= 0.63 failures/CPU hr.

Hence, there is continuous decrease in the failure intensity as the number of failure experienced increases.

LAB EXPERIMENTS-SOFTWARE ENGINEERING

Experiment: calculate Defect Density

Suppose, you have 3 modules integrated into your software product. Each module has the following number of bugs discovered-

•Module 1 = 10 bugs, Module 2 = 20 bugs, Module 3 = 10 bugs

Total bugs = 10+20+10 =40

The total line of code for each module is

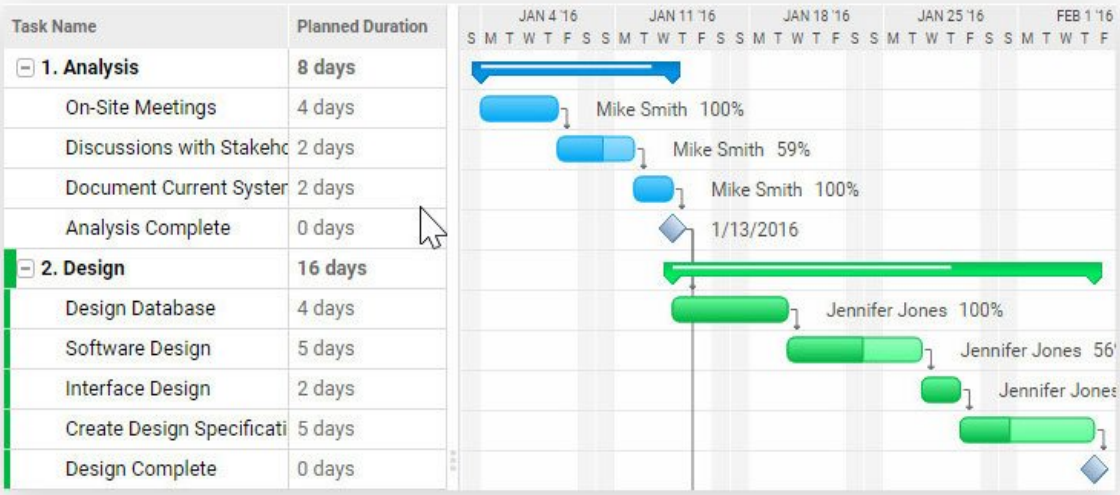
•Module 1 = 1000 LOC, Module 2 = 1500 LOC, Module 3 = 500 LOC

- Total Line of Code = 1000+1500+500 = 3000

Defect Density is calculated as:

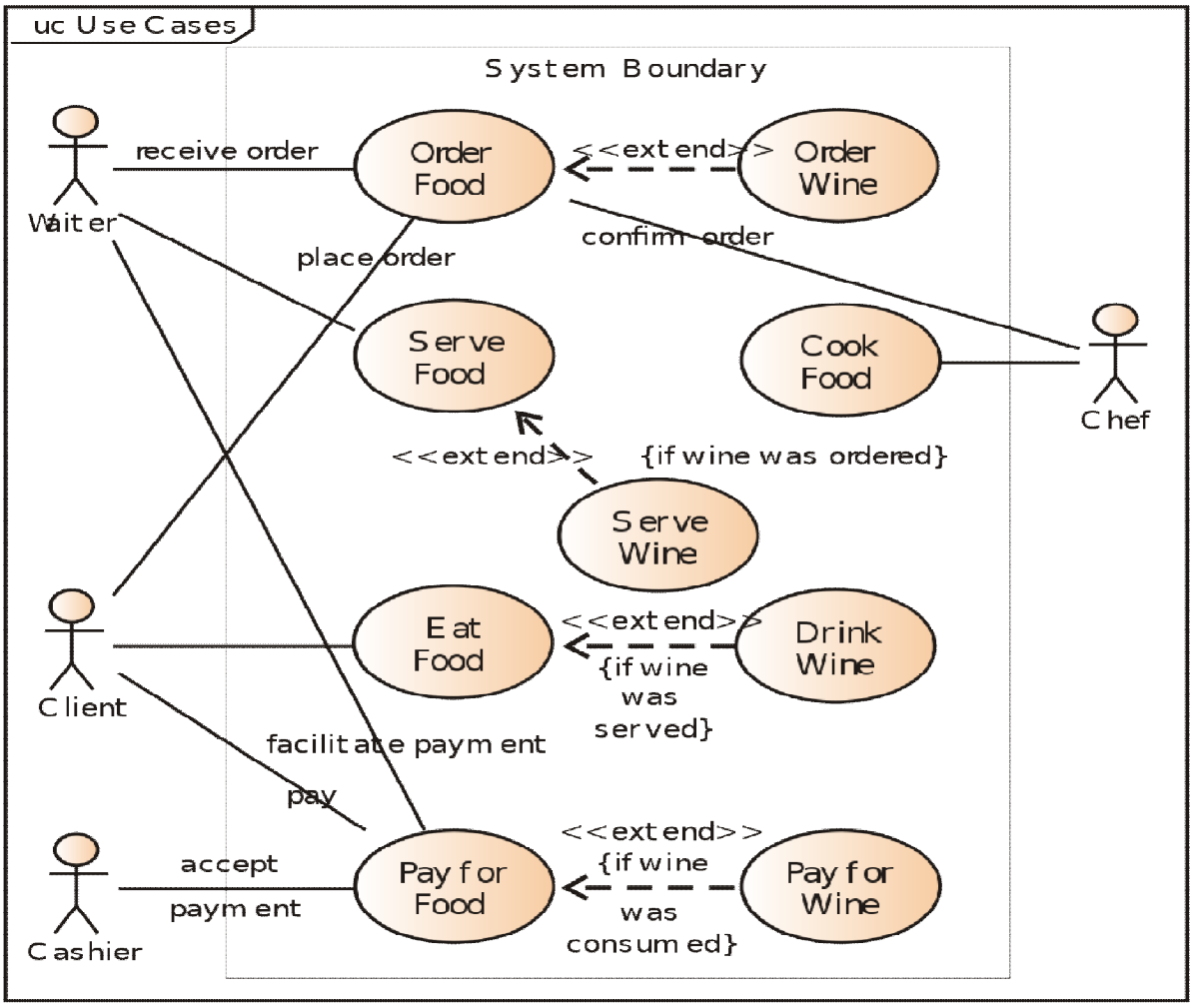
- **Defect Density = 40/3000 = 0.013333 defects/loc = 13.333 defects/Kloc**

Experiment: GANTT CHARTS



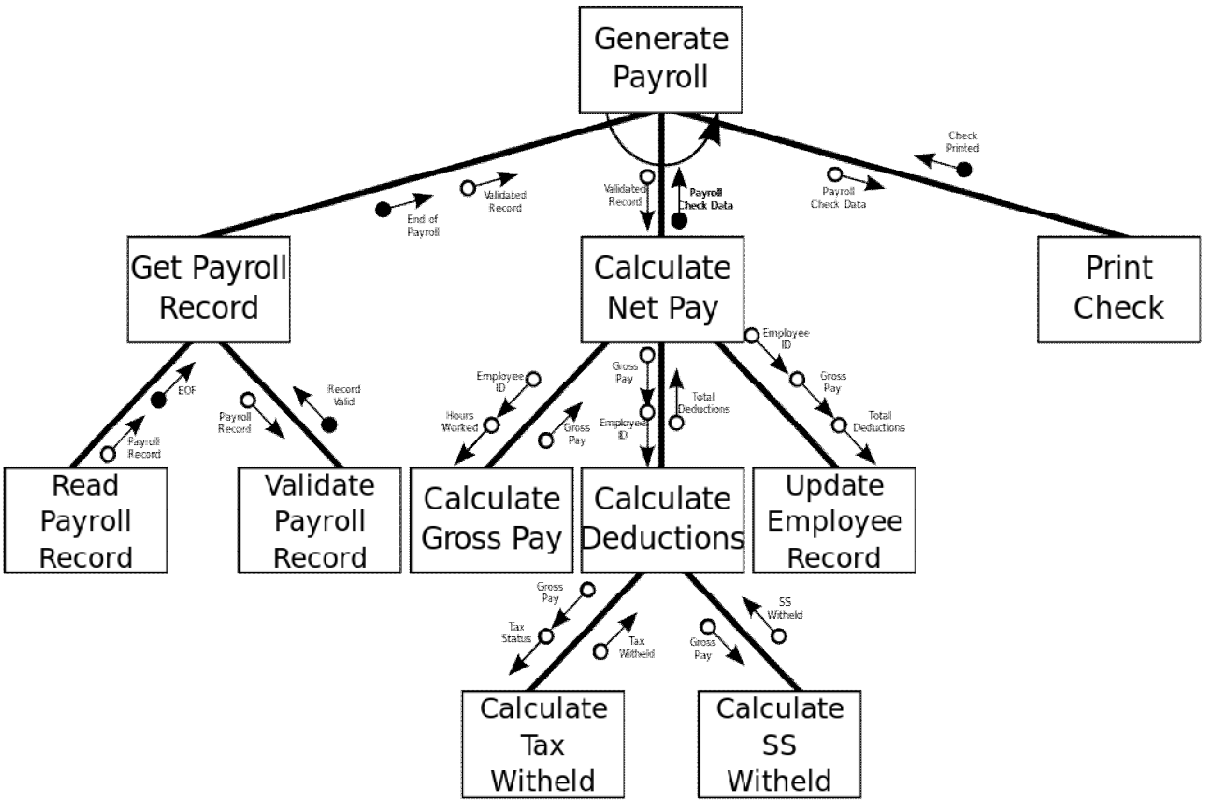
EXPERIMENT: USE CASE DIAGRAM

Draw the use case diagram for a restaurant



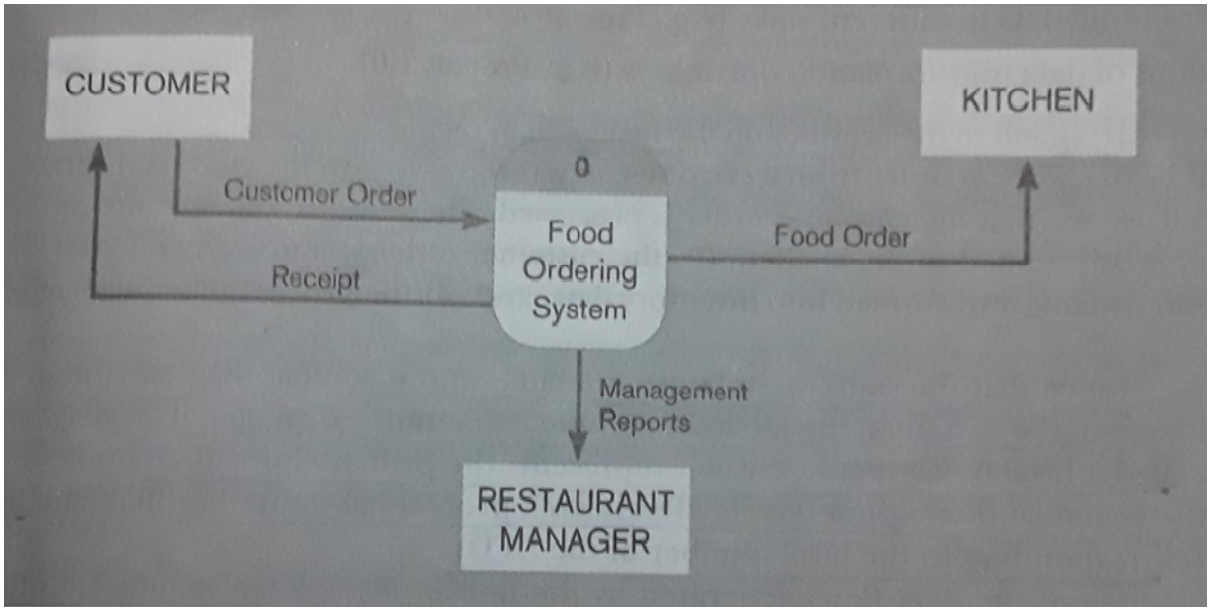
Experiment: Structure Chart

Draw the structure chart for payroll management system

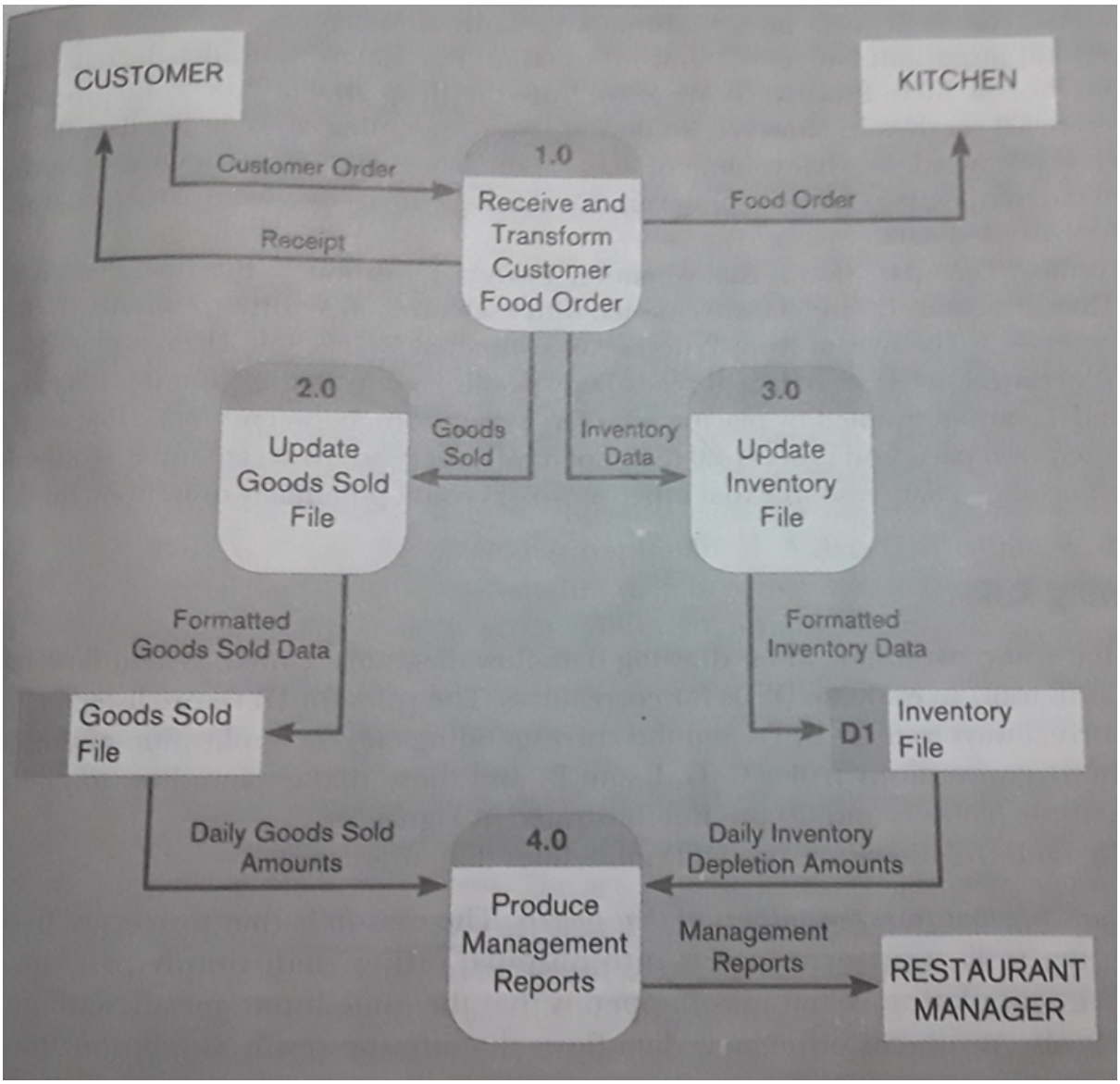


Experiment: Data Flow Diagram

Draw context diagram and level 0 DFD for food ordering system



Level 0



Experiment: Software /System Requirement Specification-SRS

PREPARE AN SRS FOR ANY APPLICATION EG-LIBRARY/COLLEGE MANAGEMENT SYSTEM

Document Title

Author(s)
Affiliation
Address
Date
Document Version

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1. **Introduction :**
   - **(i) Purpose of this Document –**
     At first, main aim of why this document is necessary and what's purpose of document is explained and described.
   - **(ii) Scope of this document –**
     In this, overall working and main objective of document and what value it will provide to customer is described and explained. It also includes a description of development cost and time required.
   - **(iii) Overview –**
     In this, description of product is explained. It's simply summary or overall review of product.

2. **General description :**
   In this, general functions of product which includes objective of user, a user characteristic, features, benefits, about why its importance is mentioned. It also describes features of user community.

3. **Functional Requirements :**
   In this, possible outcome of software system which includes effects due to operation of program is fully explained. All functional requirements which may include calculations, data processing, etc. are placed in a ranked order.

4. **Interface Requirements :**
   In this, software interfaces which mean how software program communicates with each other or users either in form of any language, code, or message are fully described and explained. Examples can be shared memory, data streams, etc.

5. **Performance Requirements :**
   In this, how a software system performs desired functions under specific condition is explained. It also explains required time, required memory, maximum error rate, etc.

6. **Design Constraints :**
   In this, constraints which simply means limitation or restriction are specified and explained for design team. Examples may include use of a particular algorithm, hardware and software limitations, etc.

7. **Non-Functional Attributes :**
   In this, non-functional attributes are explained that are required by software system for better performance. An example may include Security, Portability, Reliability, Reusability, Application compatibility, Data integrity, Scalability capacity, etc.

8. **Preliminary Schedule and Budget :**
   In this, initial version and budget of project plan are explained which include overall time duration required and overall cost required for development of project.

9. **Appendices :**
   In this, additional information like references from where information is gathered, definitions of some specific terms, acronyms, abbreviations, etc. are given and explained.