Hotel Booking System

Project Design Documentation

Version 0.2.1

By: Brandon Toews
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Table of Contents

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Section 1 – Project Overview

1.1 Purpose of Document

The purpose of this document is to provide system designs to use in the development of the hotel booking system for City and Resort hotels.

1.2 Scope

The scope of the project involves an examination of the business scenario to ascertain how best to design, develop, and improve upon the proposed hotel booking system. In addition, creation of system designs and implementation documentation must be produced to drive the development of the project. The proposed solutions must include detailed logical & physical Entity-Relationship Diagrams, a Context Diagram, and up to Level 2 Data Flow Diagrams.

Section 2 – Software Development Methodologies

2.1 Waterfall

The Waterfall methodology contains five phases that are as follows: Requirements, Design, Implementation, Verification and Maintenance. Each of these phases are present in most methodologies however with the Waterfall approach each phase is followed by the next in strict fashion. The team can only progress to the next phase when the current phase has been completed and you cannot revert back to a previous phase. This approach is useful when a high level of reliability is needed for a project.

2.2 Agile

The Agile method is an iterative approach that allows for similar phases as Waterfall to be engaged simultaneously and in no specific order. The team is able to work in small increments allowing for customer input regularly. This methodology is far more flexible in terms of adapting to changes in customer wants and needs as they see the project develop.

2.3 Preferred Software Development Methodology

The fact that there are two hotels that will be using this system in essence means that there two clients to consider in the development of this project. Each client has unique requirements that differ from one another and are subject to change. As the hospitality industry is fast paced and endeavours to adapt to ever changing customer opinions, the Agile methodology is best suited for this project. As stated above, Waterfall is great for certain projects but is highly inflexible while Agile allows for development teams to incorporate client input in small, digestible increments. This approach will translate to a product that provides more utility to the customer which in turn will result in higher customer satisfaction. (See Appendix – Waterfall Methodology, Agile Methodology)

Section 3 – Entity-Relationship Diagrams

3.1 Logical Entity-Relationship Diagram

The four entitities in this diagram are as follows: Customer, City Reservation, Resort Reservation and Invoice. Each entity has a primary key that consists of a uniquely generated number. The system is purposefully designed with no weak entities and foreign keys as this is not advisable to create a robust system. The Customer can either book a reservation at the City or Resort hotel. There is a need to delineate the City and Resort hotel reservations because of their individual discount policies. Each hotel will only reward their customers with a discount when they have previously stayed at their specific location before. In addition, the Resort hotel will only provide a discount to customers who haven't had any cancellations at their location in the past year. Therefore the Resort Reservation entity has an addition attribute labelled "Cancelled" that records whether any of the reservations have been cancelled. With the information supplied from the reservation entites the Invoice is populated. (Figure 1)
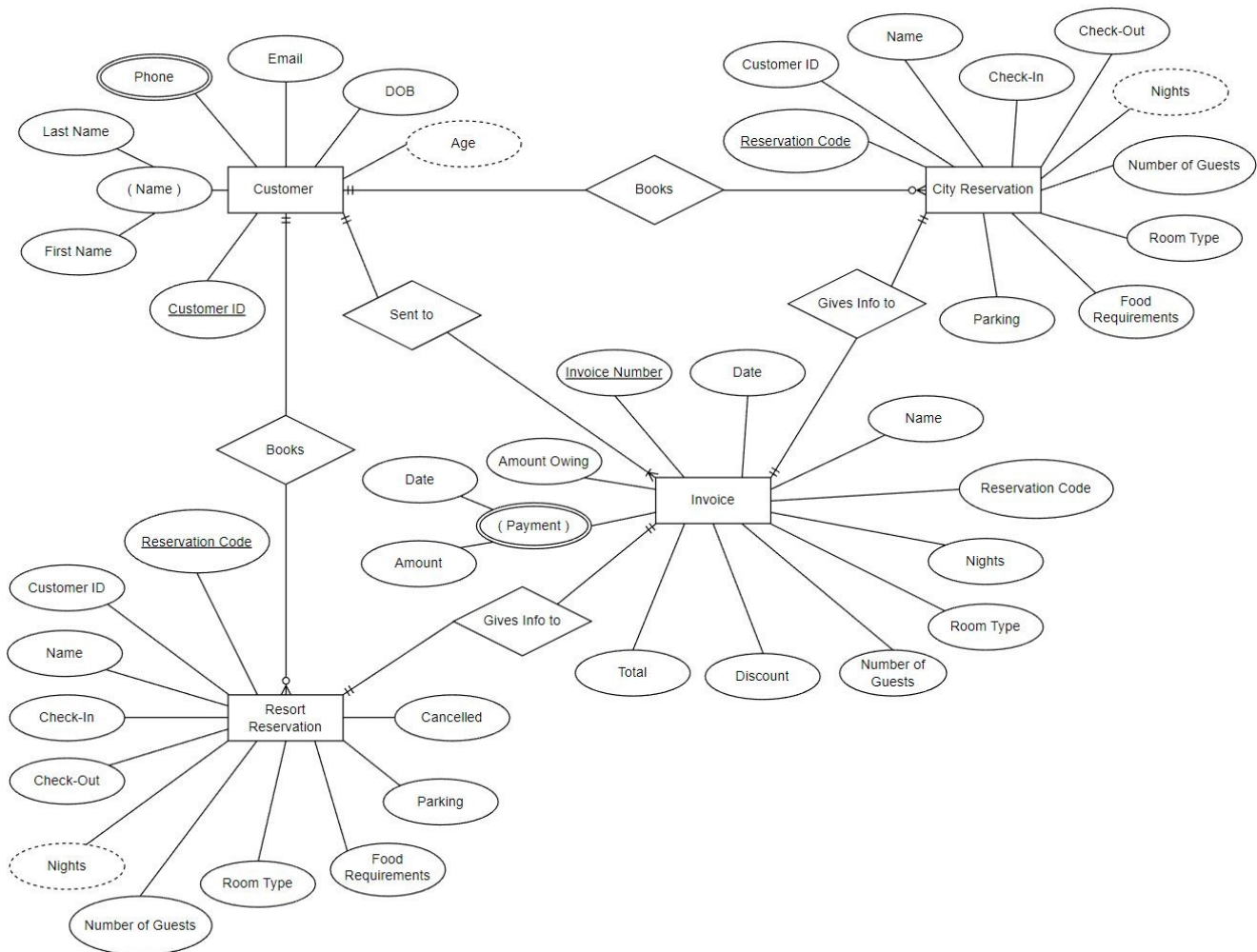

Figure 1 – Logical Entity-Relationship Diagram

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3.2 Physical Entity-Relationship Diagram

The invoice entity contains a composite and multivalued attribute labelled "Payment" that allows for storage of the date and amount for payments made towards the total. When payments are made the "Amount Owing" attribute on the entry is updated accordingly. (Figure 2)
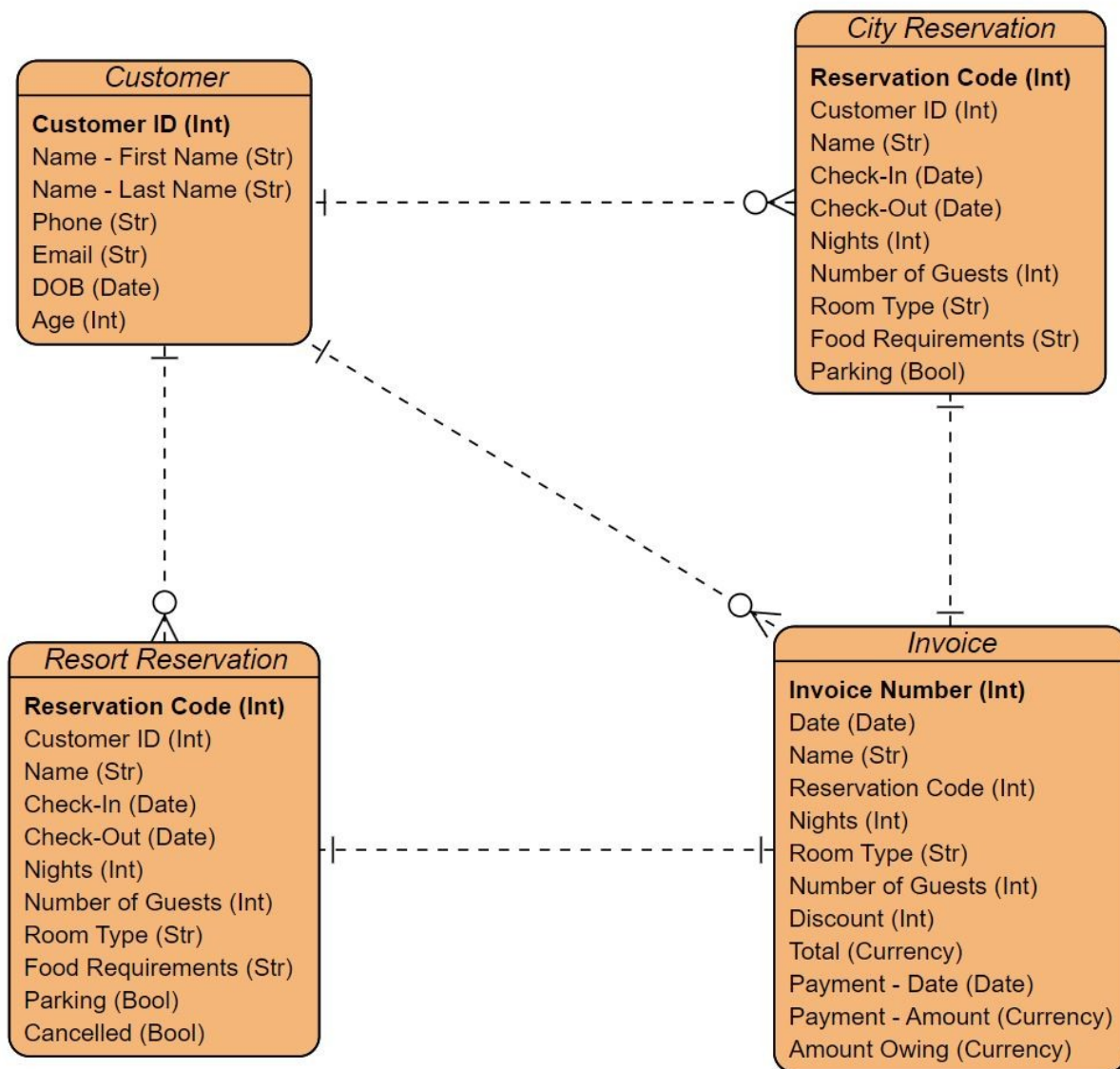

Customer

Customer ID (Int)
Name - First Name (Str)
Name - Last Name (Str)
Phone (Str)
Email (Str)
DOB (Date)
Age (Int)

City Reservation

Reservation Code (Int)
Customer ID (Int)
Name (Str)
Check-In (Date)
Check-Out (Date)
Nights (Int)
Number of Guests (Int)
Room Type (Str)
Food Requirements (Str)
Parking (Bool)

Resort Reservation

Reservation Code (Int)
Customer ID (Int)
Name (Str)
Check-In (Date)
Check-Out (Date)
Nights (Int)
Number of Guests (Int)
Room Type (Str)
Food Requirements (Str)
Parking (Bool)
Cancelled (Bool)

Invoice

Invoice Number (Int)
Date (Date)
Name (Str)
Reservation Code (Int)
Nights (Int)
Room Type (Str)
Number of Guests (Int)
Discount (Int)
Total (Currency)
Payment - Date (Date)
Payment - Amount (Currency)
Amount Owing (Currency)

Figure 2 – Physical Entity-Relationship Diagram

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3.3 Data Fields with Sample Data

Customer	
Field Name	**Sample Data**
Customer ID	7244
Name — **First Name**	John
Name — **Last Name**	Pederson
Phone	02111 960700, 87659 004493
Email	johnpederson@gmail.com
Date of Birth	22-03-1986
Age	36

City Reservation	
Field Name	**Sample Data**
Reservation Code	032211
Customer ID	7244
Name	John Pederson
Check-In	21-12-2022
Check-Out	27-12-2022
Nights	6
Number of Guests	2
Room Type	Double
Food Requirements	Breakfasts: Mushroom Omelettes
Parking	True

Resort Reservation	
Field Name	**Sample Data**
Reservation Code	750334
Customer ID	9553
Name	Bob Gunderson
Check-In	02-10-2022
Check-Out	05-10-2022
Nights	3
Number of Guests	1
Room Type	Single
Food Requirements	Vegan
Parking	False
Cancelled	True

Invoice		
Field Name		**Sample Data**
Invoice Number		0145
Date		21-12-2022
Name		John Pederson
Reservation Code		032211
Nights		6
Room Type		Double
Number of Guests		2
Discount		12
Total		£630.00
Payment	**Date**	21-12-2022
	Amount	£300.00
Payment	**Date**	27-12-2022
	Amount	£330.00
Amount Owing		£0.00

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Section 4 – Data Flow Diagrams

4.1 Context Diagram

Six (6) entities: Customer, City Hotel, Resort Hotel, Car Parking Agency, Restaurant and ABC Bank interact with the system from a data flow perspective. A hotel only interacts with the system if the customer has chosen the specified hotel. Each entity's interactions with the system will be described in further depth in the items to follow. (Figure 3)
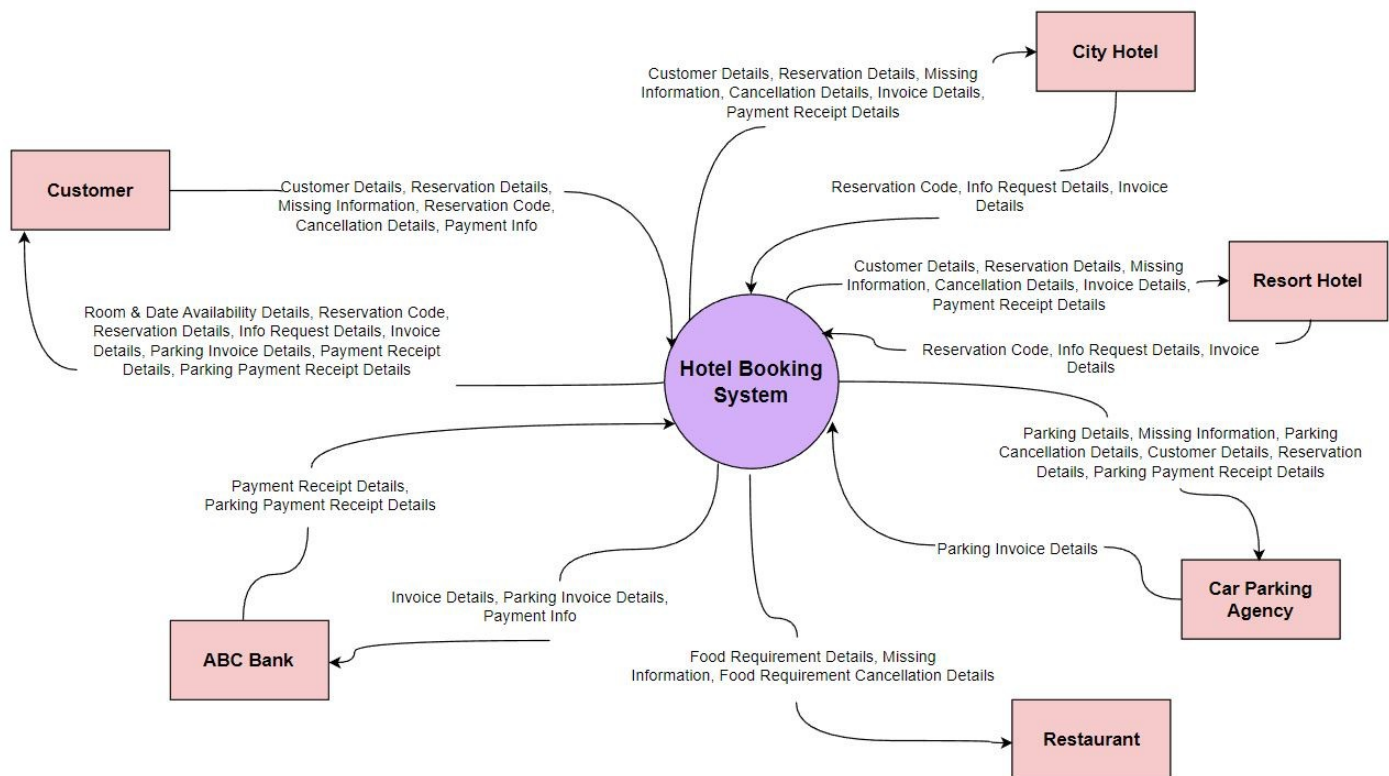

Figure 3 - Context Diagram

4.2 Level 1 DFD

There are three (3) processes depicted at level 1 that handle the flow of data for the system. **Process 1**, "Booking", involves making a reservation, obtaining missing information for the reservation and cancelling the reservation. **Process 2**, "Check-In", is where the customer checks into their room and makes an initial payment. **Process 3**, "Check-Out", ends the customer's interaction with the system by settling the remaining balance on the invoice and paying the parking invoice if the customer has opted for parking. (Figure 4)
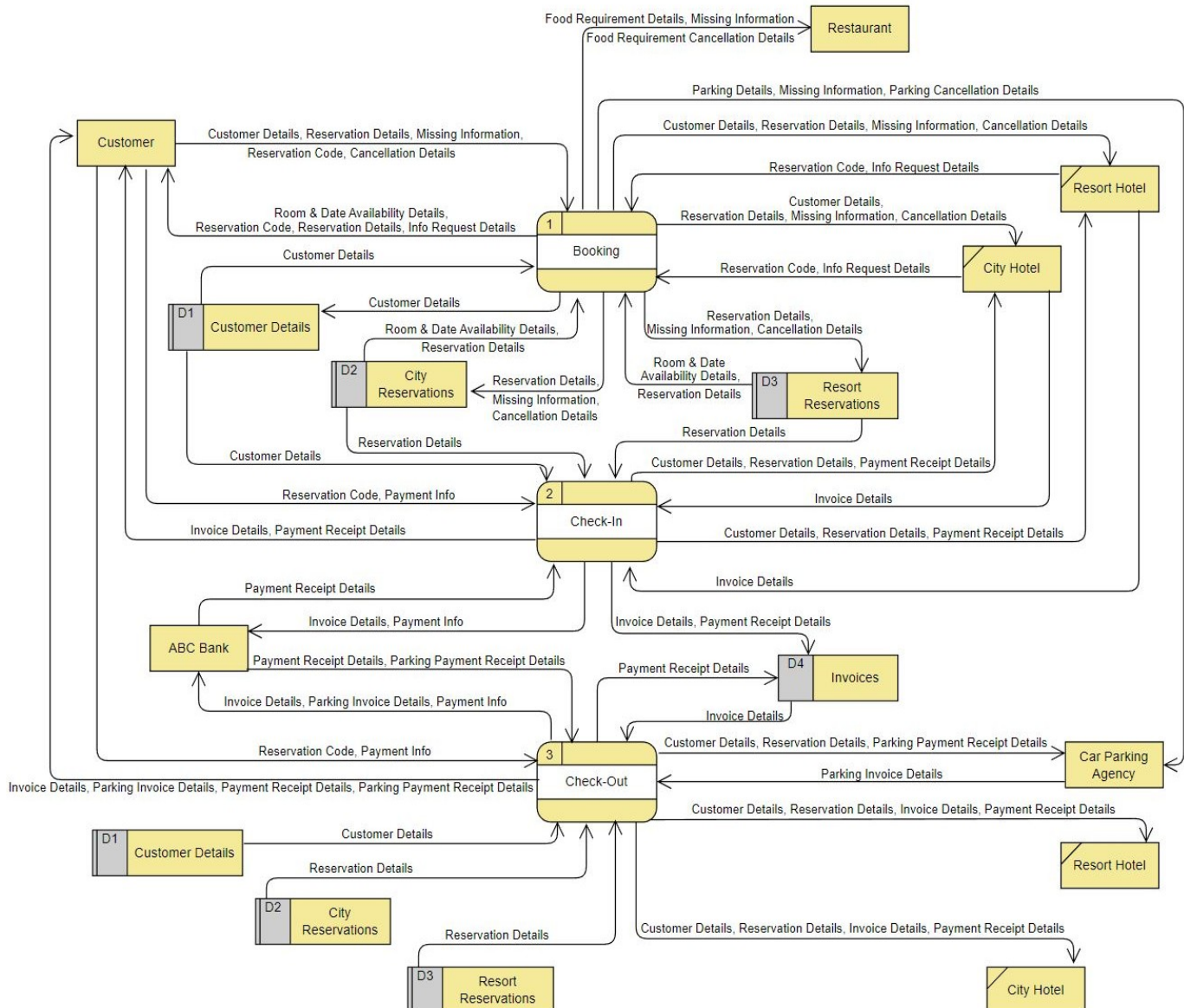

Figure 4 - Level 1 Data Flow Diagram

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4.3 Level 2 DFD – Booking Process 1

There are five (5) sub-processes depicted at level 2 of "Booking" **Process 1**. In **Process 1.1** the customer submits their customer details which are then stored. **Process 1.2** generates room and date availability information by examining current reservations which is then used by the customer to submit their reservation preferences. In **Process 1.3** the reservation details are stored and the hotel sends the customer a reservation code and request, in the form of an email, to submit missing information. The only none mandatory fields that may be missing are "Food Requirements" and "Parking". (Figures 1, 2 and Item 3.3) **Process 1.4** gives the customer an opportunity to submit the missing information by clicking a link provided in the information request email and filling in the missing fields. This new information is then sent to the hotel, restaurant and parking agency along with being saved in the customer's reservation entry. **Process 1.5** allows the customer to cancel the reservation if desired. When a cancellation is made the "Cancellation" field is updated if it is a Resort reservation entry or it deletes the entry in the case of a City reservation. All relevant parties are then informed of the cancellation. (Figure 5)
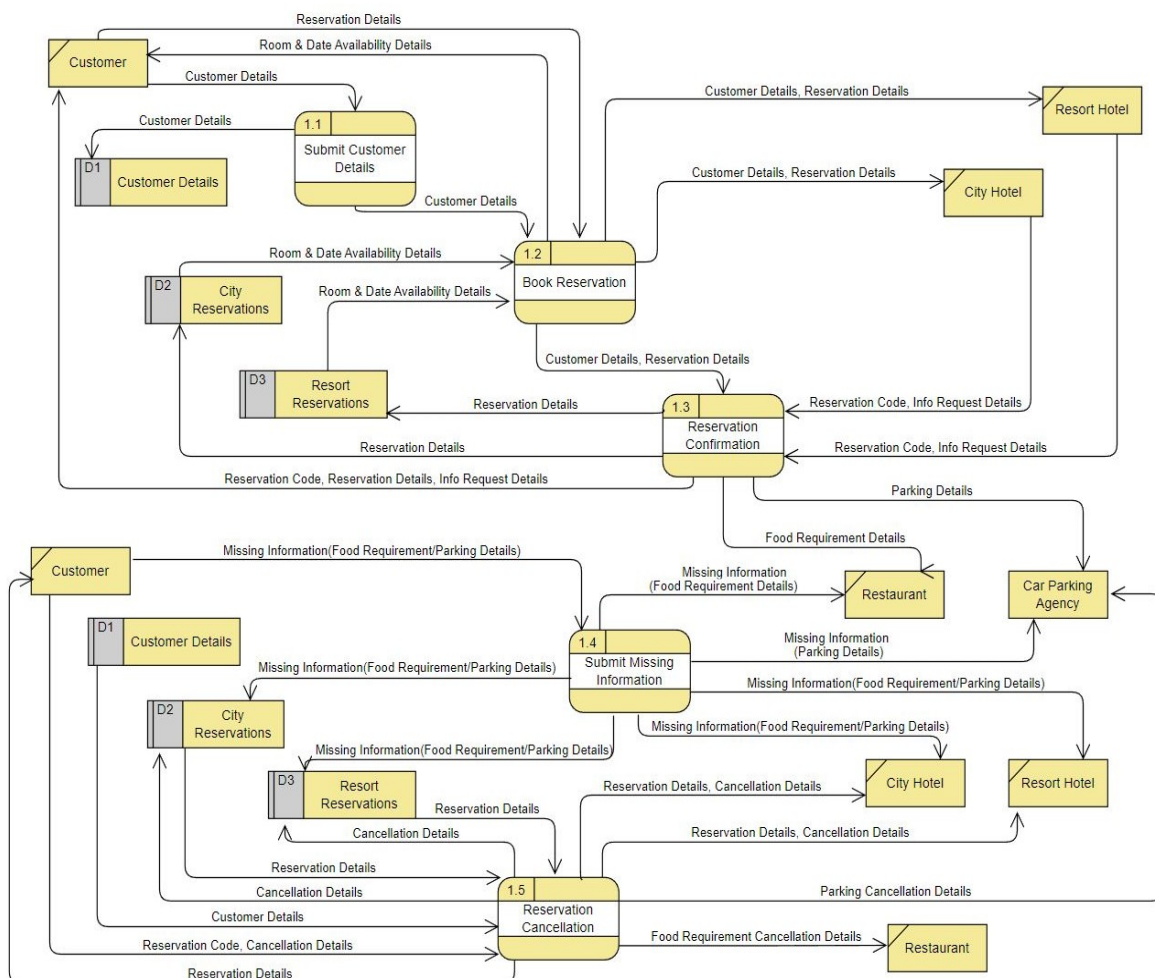

Figure 5 – Level 2 Data Flow Diagram Booking Process 1

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4.4 Level 2 DFD – Check-In Process 2

There are four (4) sub-processes depicted at level 2 of "Check-In" **Process 2**. In **Process 2.1** the customer submits their reservation code which is then used to extract the customer's details and reservation. This information is used by the hotel to generate an invoice which is then stored and a copy is sent to the customer in **Process 2.2**. In **Process 2.3** the customer submits payment information which is then received by ABC bank along with the invoice. In **Process 2.4** the bank handles the payment, sends payment confirmation to all relevant parties and the invoice entry is updated with payment details. (Figure 6)
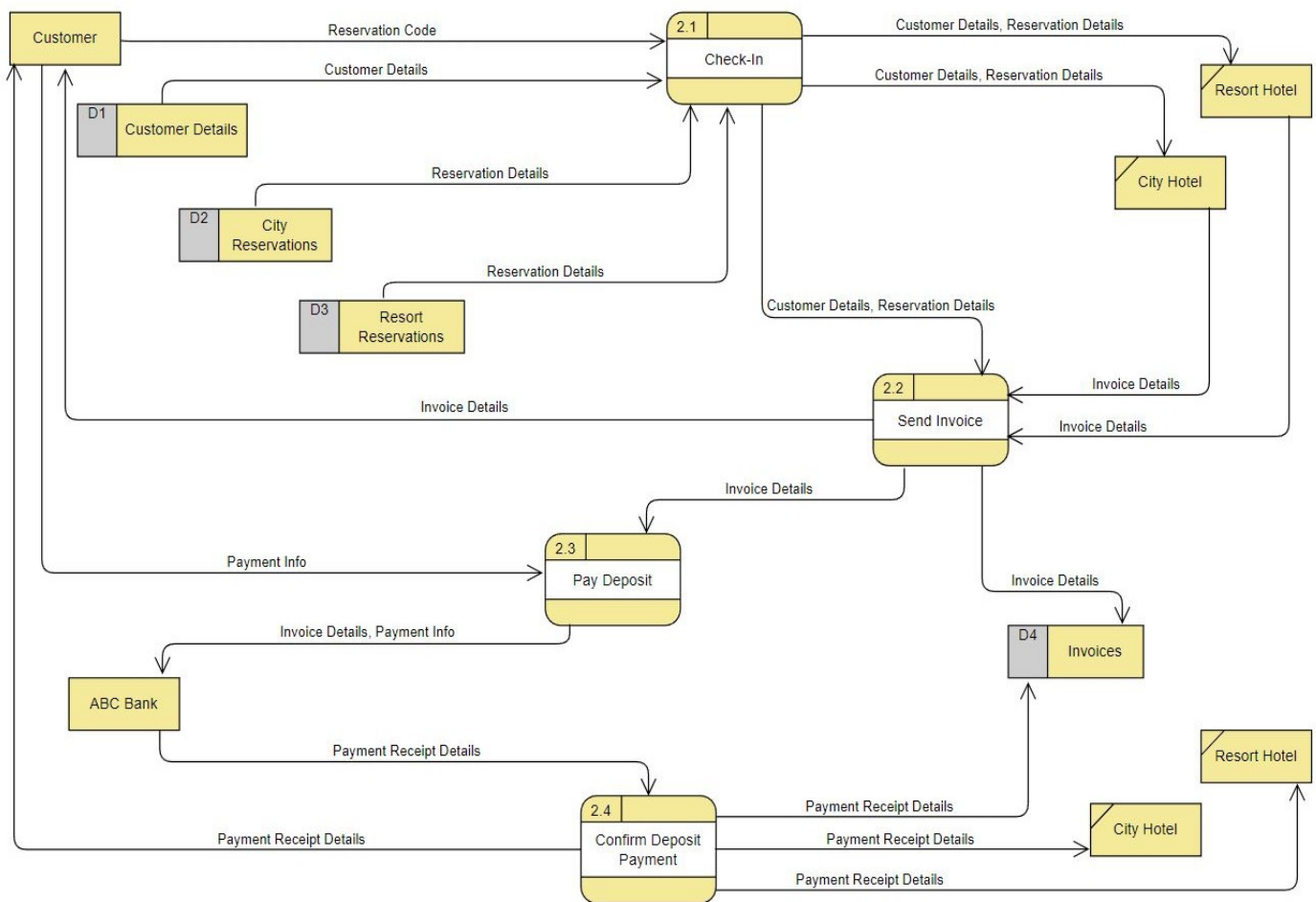

Figure 6 – Level 2 Data Flow Diagram Check-In Process 2

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4.5 Level 2 DFD – Check-Out Process 3

There are three (3) sub-processes depicted at level 2 of "Check-Out" **Process 3**. In **Process 3.1** the customer submits their reservation code which is then used by the hotel to bring up the customer's details, reservation and invoice. The customer details and reservation are also sent to the Car Parking Agency which uses **Process 3.2** to send the customer a parking invoice along with their hotel invoice. In **Process 3.3** the customer submits payment information for both invoices, which is then received by ABC bank along with both invoices. In **Process 3.4** the bank processes the payment and sends payment confirmation to all relevant parties and the hotel invoice entry is updated with payment details. (Figure 7)
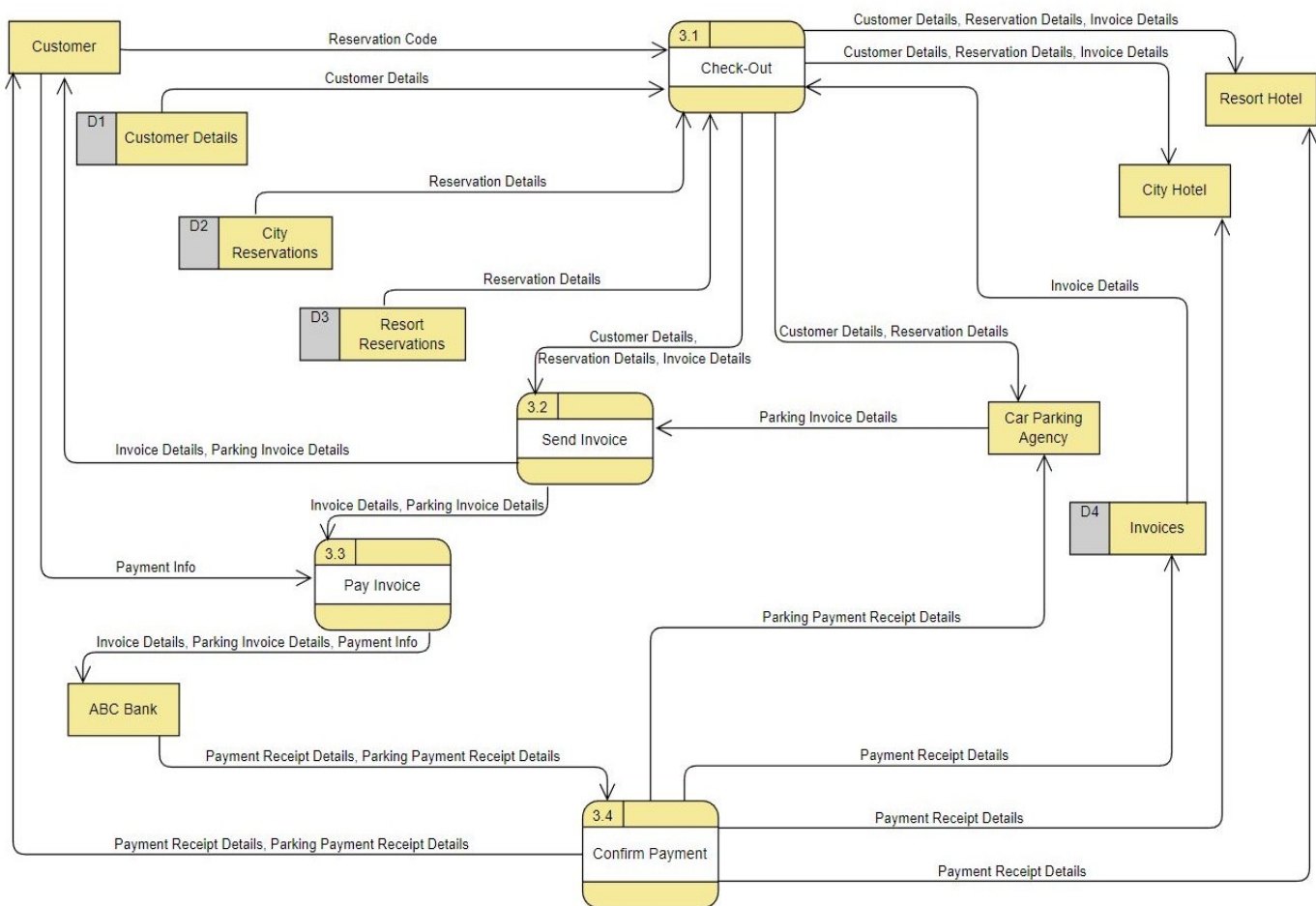

Figure 7 – Level 2 Data Flow Diagram Check-Out Process 3

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Section 5 – Improvements

5.1 Additional Review Process

An improvement upon the system could be acheived by adding a fourth process at level 1 to prompt the customer to provide a review. The review information could then be stored in an additional field in the reservation data stores. This review information could then be analyzed by AI technology to produce actionable suggestions on how to improve the customer's experience.

5.2 Sentiment & Intent Analysis

Natural language processing could be employed to analyze thousands of reviews to identify recurring themes and topics reported on by customers. These can then be rated so that hotel staff can see how customers feel and why they feel that way. This would allow for staff to see where best to make improvements to their services thereby increasing customer satisfaction. (Appendix – Sentiment & Intent Analysis)

Appendix

References

Waterfall Methodology

https://www.projectmanager.com/guides/waterfall-methodology/

https://www.forbes.com/advisor/business/what-is-waterfall-methodology/

Agile Methodology

https://www.atlassian.com/agile

https://www.youtube.com/watch?v=GzzkpAOxHXs

Sentiment & Intent Analysis

https://www.lexalytics.com/technology/sentiment-analysis/

https://www.lexalytics.com/technology/intentions/