

KINGDOM OF SAUDI  
ARABIA  
Ministry of Higher Education  
Al-Imam Mohammad  
University  
College of Computer &  
Information Sciences



المملكة العربية السعودية  
وزارة التعليم العالي  
جامعة الإمام محمد بن سعود الإسلامية  
كلية علوم الحاسب والمعلومات

Second term 1441/2020

**Software Engineering (CS- 310)**  
**Section: 171**

**Project-Phase No: 2**  
**Computer Recommendation Software (CRS)**  
**(Design Document)**

**Submitted By**

Saad BinOnayq (439017145) – Coordinator

Fawzan alhantoshi (439014363)

Mohammed Alkhalifah (439011298)

Tareq Alagel (433000438)

Khaled Almodameeg (438013580)

**Supervisor**

Sultan Alqahtanie

**Date: 2020\2\10**

# Table of Contents

<b>Abstract</b>	<b>4</b>
<b>1. Introduction</b>	<b>5</b>
1.1 Purpose	5
1.2 Scope	5
1.3 Definitions, Acronyms, and Abbreviations	5
1.4 References	5
1.5 Overview	6
<b>2. Design</b>	<b>6</b>
2.1 System Level Diagram	6
2.1.1 Use-Case Diagram	6
2.1.2 MVC Pattern	7
2.2 Class Diagram	8
2.3 Class Method Description	9
2.3.1 ProductListAdapter	9
2.3.2 ResultActivity	10
2.3.3 MainActivity	12
2.4 State Charts	25
2.5 Flowchart Diagram	26
2.6 User Interface Design	27
<b>3. Conclusion</b>	<b>31</b>



## ***Abstract***

In phase one (SRS), we describe how the system will serve the end user and show in detail the functional and non-functional requirements. In This phase which is design document (DD) we will show the Computer recommendation software (CRS) in an architectural approach in different graphical view, methods description will be written in a table view.

## 1. Introduction

In phase one (SRS) we describe the CRS application and how it will serve the end user, in DD we will define the System architecture and models in a graphical way.

### 1.1 Purpose

The purpose of DD is to describe the design of “Computer recommendation software” and its inputs and outputs for the first version in detail.

### 1.2 Scope

The “Computer Recommendation Software” is a mobile application which helps people to find computers that fit their field of interests. By recommending a system based on the user’s specification, and combine all components in a single convenient page. It also suggests some applications to the user based on the type of the recommended system. The application should also be free and downloadable through a mobile phone application store or similar services.

All items will be provided from websites (such as Newegg) through API. Then, this application will simply process through all the data and display them to the user.

Furthermore, this software requires internet connection to be able to connect to websites to get all the needed data for this application. It also has the capability to get all items by their best value based on the user's region. And for each item it also includes a brief description, summary and pros and cons of the recommended system.

### 1.3 Definitions, Acronyms, and Abbreviations

Term	Definitions
CRS	Computer Requirement Software “This Application”
SRS	System Requirement Specification
<i>MySQL</i>	An open source database management system (RDBMS)
<i>DD</i>	Design document
<i>URL</i>	Uniform Resource Locator, colloquially termed a web address, is a reference to a web resource that specifies its location on computer network

### 1.4 References

- [1] Android developers, Founded in 2004, <https://developer.android.com/>
- [2]. Lucid charts, December 2008, <https://www.lucidchart.com>.
- [3]. Diagrams.net, <https://app.diagrams.net/>.

[4] Adobe photoshop, February 19, 1990, Adobe,  
<https://www.adobe.com/products/photoshopfamily.html>.

[5] Google docs, March 9, 2006, Google, <https://www.google.com/docs/about/>.

## **1.5 Overview**

In section two we will describe graphically the System level diagram, Class diagram, Class method description (Table view), State charts, Flowchart diagram and User interface design. The third section provides contributions of team members and the conclusion.

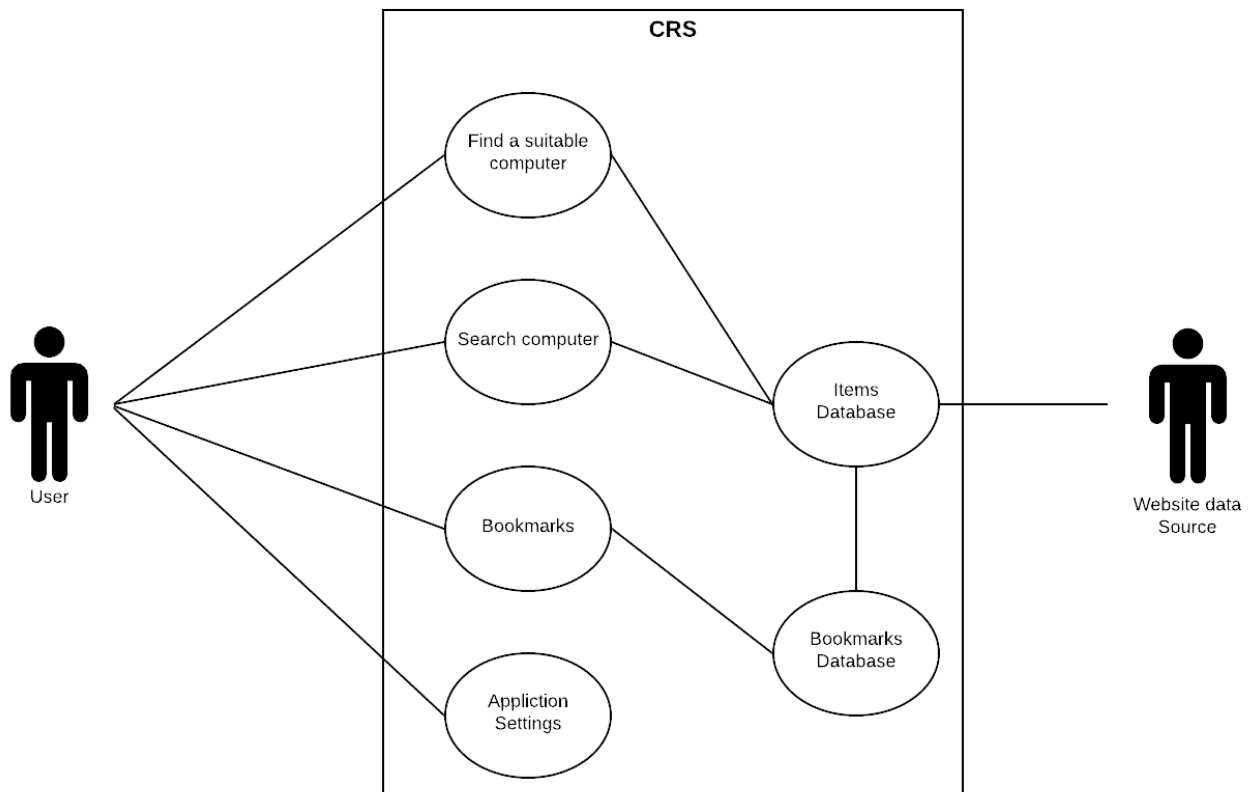
## **2. Design**

This section will graphically describe all the designs in DD.

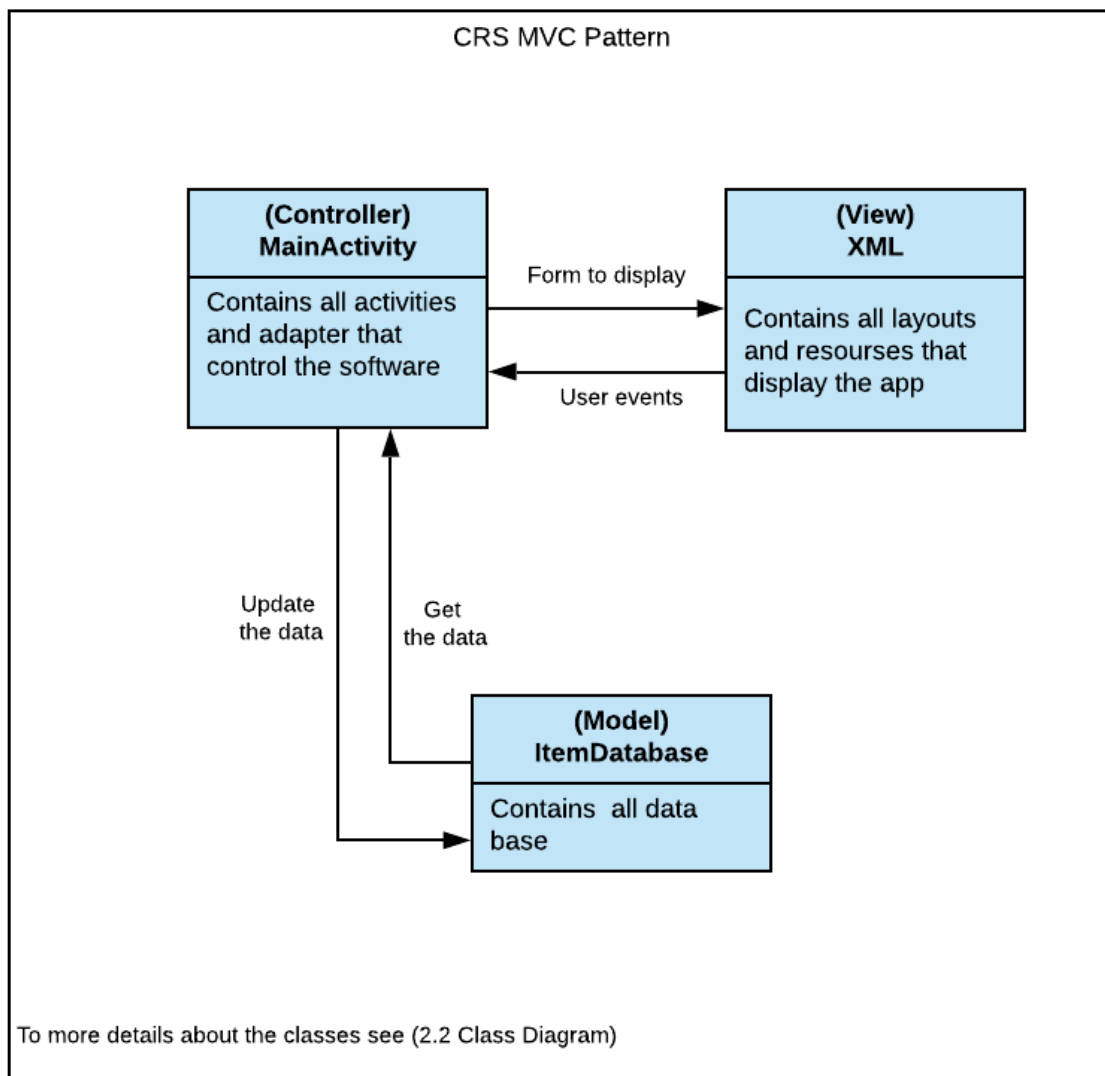
### **2.1 System Level Diagram**

This subsection will be considered in the System level diagram (Use Case and MVC pattern).

### 2.1.1 Use-Case Diagram

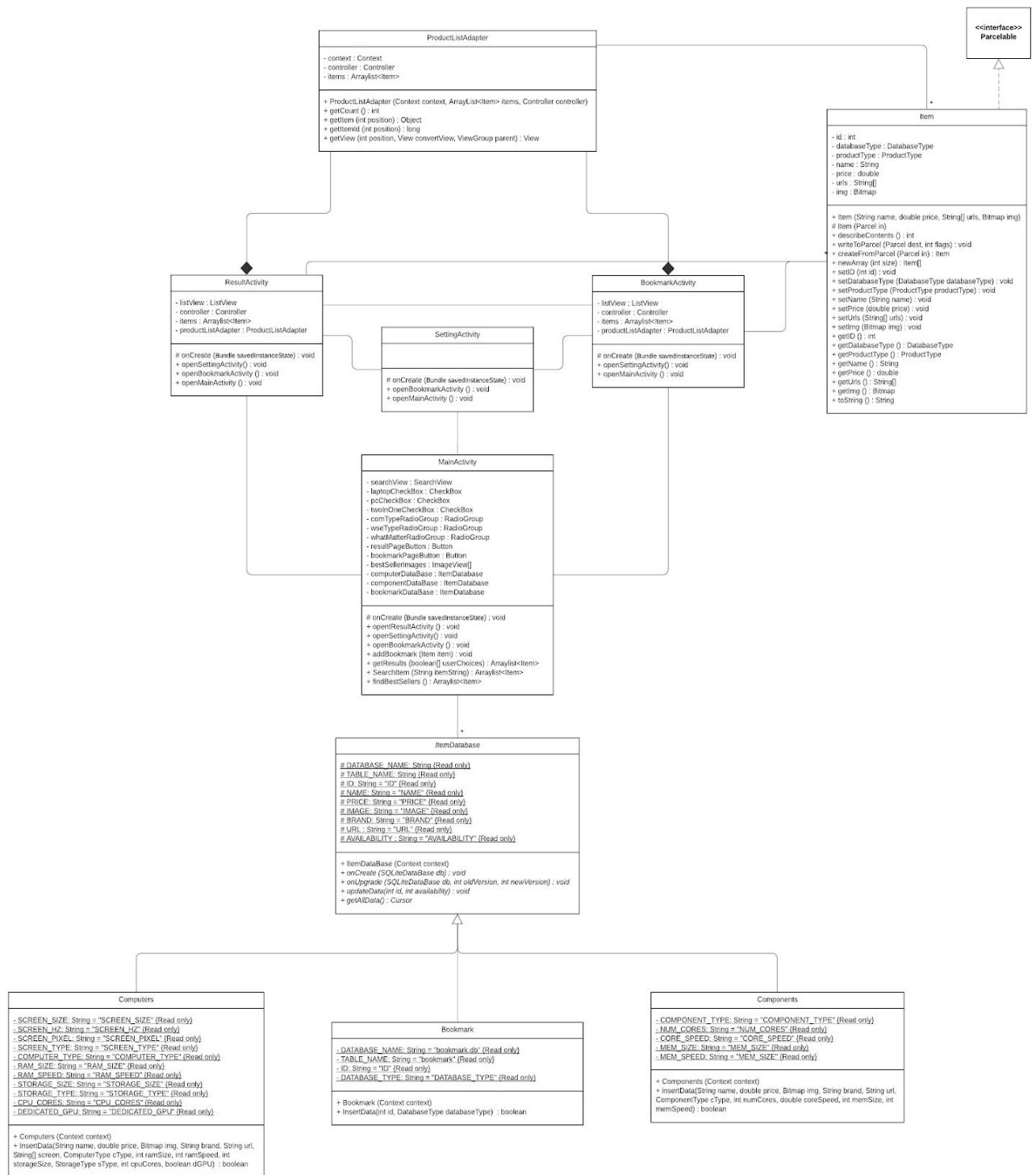


### 2.1.2 MVC Pattern





## 2.2 Class Diagram



## 2.3 Class Method Description

This section to list all the methods of the classes.

### 2.3.1 *ProductListAdapter*

This class to customize the view of list adapter.

<b>Class</b>	ProductListAdapter
<b>Method</b>	ProductListAdapter
<b>Visibility</b>	Public
<b>Return Type</b>	Constructor
<b>Parameters types</b>	Context:context, ArrayList:items, Controller:controller
<b>Description</b>	This is the Constructor for the ProductListAdapter class.

<b>Class</b>	ProductListAdapter
<b>Method</b>	getCount
<b>Visibility</b>	Public
<b>Return Type</b>	int
<b>Parameters types</b>	None
<b>Description</b>	get the size of the ArrayList items.

<b>Class</b>	ProductListAdapter
<b>Method</b>	getItem
<b>Visibility</b>	Public
<b>Return Type</b>	Object
<b>Parameters types</b>	int:position
<b>Description</b>	get the item by its position in the ArrayList items.

<b>Class</b>	ProductListAdapter
<b>Method</b>	getItemId
<b>Visibility</b>	Public
<b>Return Type</b>	long
<b>Parameters types</b>	int:position
<b>Description</b>	get the item Id by its position in the ArrayList items.

<b>Class</b>	ProductListAdapter
<b>Method</b>	getView
<b>Visibility</b>	Public
<b>Return Type</b>	View
<b>Parameters types</b>	int:position, View:convertView, ViewGroup:parent
<b>Description</b>	Get a view that displays the data at the specified position in the data set.

### 2.3.2 ResultActivity

This class to view the result page.

<b>Class</b>	ResultActivity
<b>Method</b>	onCreate
<b>Visibility</b>	Protected
<b>Return Type</b>	void
<b>Parameters types</b>	Bundle:savedInstanceState
<b>Description</b>	This method to initialize the class.

<b>Class</b>	ResultActivity
<b>Method</b>	openSettingActivity
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	None
<b>Description</b>	To open the settings of the result activity.

<b>Class</b>	ResultActivity
<b>Method</b>	openBookmarkActivity
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	None
<b>Description</b>	To open the bookmark of the result activity.

<b>Class</b>	ResultActivity
<b>Method</b>	openMainActivity
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	None
<b>Description</b>	To open the main of the result activity.

### 2.3.3 MainActivity

This class to view the main page.

<b>Class</b>	MainActivity
<b>Method</b>	onCreate
<b>Visibility</b>	Protected
<b>Return Type</b>	void
<b>Parameters types</b>	Bundle:savedInstanceState
<b>Description</b>	This method to initialize the class.

<b>Class</b>	MainActivity
<b>Method</b>	openResultActivity
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	None
<b>Description</b>	To open the result activity class.

<b>Class</b>	MainActivity
<b>Method</b>	openSettingsActivity
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	None
<b>Description</b>	To open the settings activity class.

<b>Class</b>	MainActivity
<b>Method</b>	openBookmarkActivity
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	None
<b>Description</b>	To open the bookmark activity class.

<b>Class</b>	MainActivity
<b>Method</b>	addBookmark
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	Item:Item
<b>Description</b>	This method adds a bookmark.

<b>Class</b>	MainActivity
<b>Method</b>	getResults
<b>Visibility</b>	Public
<b>Return Type</b>	ArrayList<Item>
<b>Parameters types</b>	boolean[]:userChoices
<b>Description</b>	This method gets the result depending on the user choices.

<b>Class</b>	MainActivity
<b>Method</b>	SearchItem
<b>Visibility</b>	Public
<b>Return Type</b>	ArrayList<Item>
<b>Parameters types</b>	String itemString
<b>Description</b>	This method gets the result depending on the user choices.

<b>Class</b>	MainActivity
<b>Method</b>	findBestSellers
<b>Visibility</b>	Public
<b>Return Type</b>	ArrayList<Item>
<b>Parameters types</b>	None
<b>Description</b>	This method to find the best sellers.

#### 2.3.4 BookmarkActivity

This class to view the Bookmark page.

<b>Class</b>	BookmarkActivity
<b>Method</b>	onCreate
<b>Visibility</b>	Prptected
<b>Return Type</b>	void
<b>Parameters types</b>	Bundle:savedInstanceState
<b>Description</b>	This method to initialize the class.

<b>Class</b>	BookmarkActivity
<b>Method</b>	openSettingsActivity
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	None
<b>Description</b>	To open the settings activity class.

<b>Class</b>	BookmarkActivity
<b>Method</b>	openMainActivity
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	None
<b>Description</b>	To open the main activity class.

### 2.3.5 *SettingActivity*

This class to view the settings page.

<b>Class</b>	SettingActivity
<b>Method</b>	onCreate
<b>Visibility</b>	Protected
<b>Return Type</b>	void
<b>Parameters types</b>	Bundle:sacedInstanceState
<b>Description</b>	This method to initialize the class.

<b>Class</b>	SettingActivity
<b>Method</b>	openBookmarkActivity
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	None
<b>Description</b>	This method opens the BookmarkActivity class.



<b>Class</b>	SettingActivity
<b>Method</b>	openMainActivity
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	None
<b>Description</b>	This method opens the MainActivity class.

### 2.3.6 Item

This class temporarily holds an item from the database.

<b>Class</b>	Item
<b>Method</b>	Item
<b>Visibility</b>	Public
<b>Return Type</b>	Constructor
<b>Parameters types</b>	String:name, double:price, String[:urls, Bitmap:img
<b>Description</b>	To construct the class with several parameters.

<b>Class</b>	Item
<b>Method</b>	Item
<b>Visibility</b>	Protected
<b>Return Type</b>	Constructor
<b>Parameters types</b>	Parcel:in
<b>Description</b>	To construct the class with Parcel.

<b>Class</b>	Item
<b>Method</b>	describeContents
<b>Visibility</b>	Public
<b>Return Type</b>	int
<b>Parameters types</b>	None.
<b>Description</b>	Describe the kinds of special objects contained in this parcelable instance's marshaled representation.

<b>Class</b>	Item
<b>Method</b>	writeToParcel
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	Parcel:dest, int:flags
<b>Description</b>	Flatten this object into a parcel.

<b>Class</b>	Item
<b>Method</b>	createFromParcel
<b>Visibility</b>	Public
<b>Return Type</b>	Item
<b>Parameters types</b>	Parcel:in
<b>Description</b>	Create an item from Parcel interface.

<b>Class</b>	Item
<b>Method</b>	setID
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	int:id
<b>Description</b>	To set the item's ID.

<b>Class</b>	Item
<b>Method</b>	setDatabaseType
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	DatabaseType:databaseType
<b>Description</b>	To set the item's Database type.

<b>Class</b>	Item
<b>Method</b>	setProductType
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	ProductType:productType
<b>Description</b>	To set the item's product type.

<b>Class</b>	Item
<b>Method</b>	setName
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	String:name
<b>Description</b>	To set the item's name.

<b>Class</b>	Item
<b>Method</b>	setPrice
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	double price
<b>Description</b>	To set the item's price.

<b>Class</b>	Item
<b>Method</b>	setUrls
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	String[]:urls
<b>Description</b>	To set the item's URL.

<b>Class</b>	Item
<b>Method</b>	setImg
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	Bitmap:img
<b>Description</b>	To set the item's image.

<b>Class</b>	Item
<b>Method</b>	getID
<b>Visibility</b>	Public
<b>Return Type</b>	int
<b>Parameters types</b>	None
<b>Description</b>	To get the item's ID.

<b>Class</b>	Item
<b>Method</b>	getDatabaseType
<b>Visibility</b>	Public
<b>Return Type</b>	DatabaseType
<b>Parameters types</b>	None
<b>Description</b>	To get the item's Database type.

<b>Class</b>	Item
<b>Method</b>	getProductType
<b>Visibility</b>	Public
<b>Return Type</b>	ProductType
<b>Parameters types</b>	None
<b>Description</b>	To get the item's product type.

<b>Class</b>	Item
<b>Method</b>	getName
<b>Visibility</b>	Public
<b>Return Type</b>	String
<b>Parameters types</b>	None
<b>Description</b>	To get the item's name.

<b>Class</b>	Item
<b>Method</b>	getprice
<b>Visibility</b>	Public
<b>Return Type</b>	double
<b>Parameters types</b>	None
<b>Description</b>	To get the item's price.

<b>Class</b>	Item
<b>Method</b>	getUrls
<b>Visibility</b>	Public
<b>Return Type</b>	String[]
<b>Parameters types</b>	None
<b>Description</b>	To get the item's URL.

<b>Class</b>	Item
<b>Method</b>	getImg
<b>Visibility</b>	Public
<b>Return Type</b>	Bitmap
<b>Parameters types</b>	None
<b>Description</b>	To get the item's image.

<b>Class</b>	Item
<b>Method</b>	toString
<b>Visibility</b>	Public
<b>Return Type</b>	String
<b>Parameters types</b>	None
<b>Description</b>	To print the item's info.

### 2.3.7 *ItemDatabase*

This class temporarily holds an item from the database.

<b>Class</b>	ItemDatabase
<b>Method</b>	ItemDataBase
<b>Visibility</b>	Public
<b>Return Type</b>	String
<b>Parameters types</b>	Context:context
<b>Description</b>	To construct the class.

<b>Class</b>	ItemDatabase
<b>Method</b>	onCreate
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	SQLiteDataBase:db
<b>Description</b>	To initial the database.

<b>Class</b>	ItemDatabase
<b>Method</b>	onUpgrade
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	SQLiteDataBase:db, int:oldVersion, int:newVersion
<b>Description</b>	To upgrade the database.

<b>Class</b>	ItemDatabase
<b>Method</b>	getAllData
<b>Visibility</b>	Public
<b>Return Type</b>	Cursor
<b>Parameters types</b>	None
<b>Description</b>	To get all the data from the database.

### 2.3.8 Bookmark

This class manages the bookmark database.

<b>Class</b>	Bookmark
<b>Method</b>	Bookmark
<b>Visibility</b>	Public
<b>Return Type</b>	Constructor
<b>Parameters types</b>	Context:context
<b>Description</b>	To construct the bookmark class using context.

<b>Class</b>	Bookmark
<b>Method</b>	InsertData
<b>Visibility</b>	Public
<b>Return Type</b>	boolean
<b>Parameters types</b>	int:id, DatabaseType:databaseType
<b>Description</b>	This method inserts data into the database.

### 2.3.9 Components

This class manages the components database.

<b>Class</b>	Components
<b>Method</b>	Components
<b>Visibility</b>	Public
<b>Return Type</b>	Constructor
<b>Parameters types</b>	Context:context
<b>Description</b>	To construct the components class using context.



<b>Class</b>	Components
<b>Method</b>	insertData
<b>Visibility</b>	Public
<b>Return Type</b>	void
<b>Parameters types</b>	String:name, double:price, Bitmap:img, String:brand, String:url, ComponentType:cType, int:numCores, double:coreSpeed, int:memSize, int:memSpeed
<b>Description</b>	To insert data into the database.

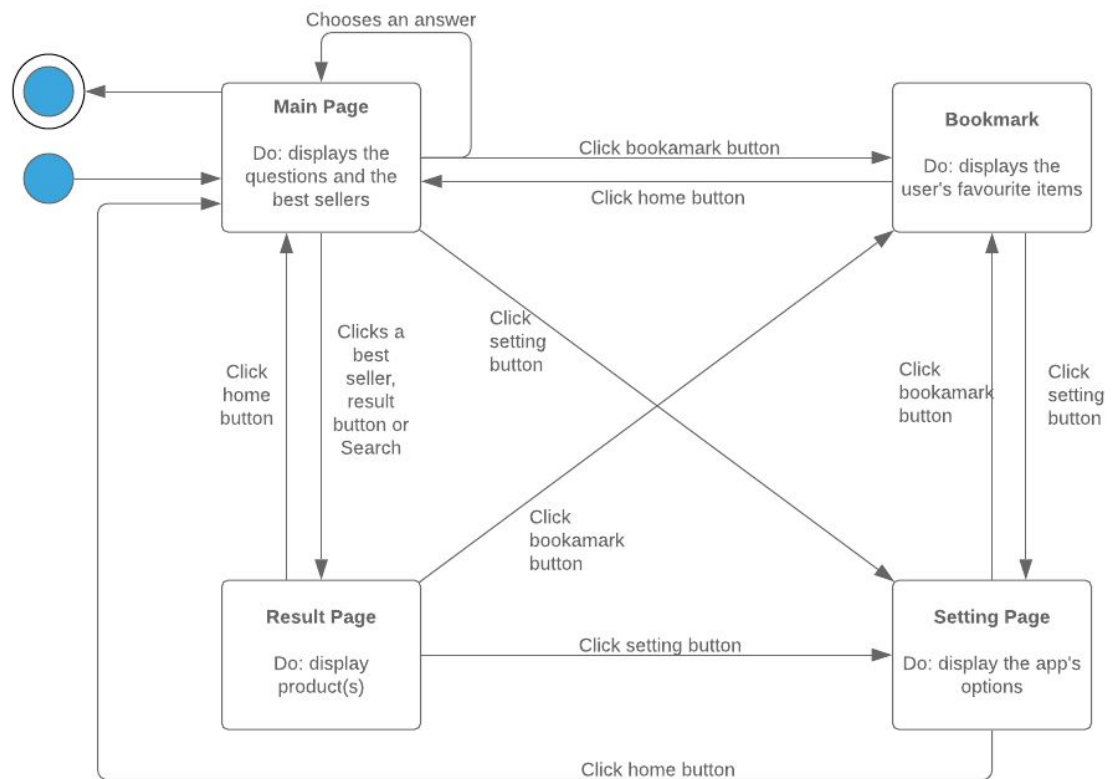
### 2.3.10 Computers

This class manages the computers database.

<b>Class</b>	Computers
<b>Method</b>	Computers
<b>Visibility</b>	Public
<b>Return Type</b>	Constructor
<b>Parameters types</b>	Context:context
<b>Description</b>	To construct the computer class.

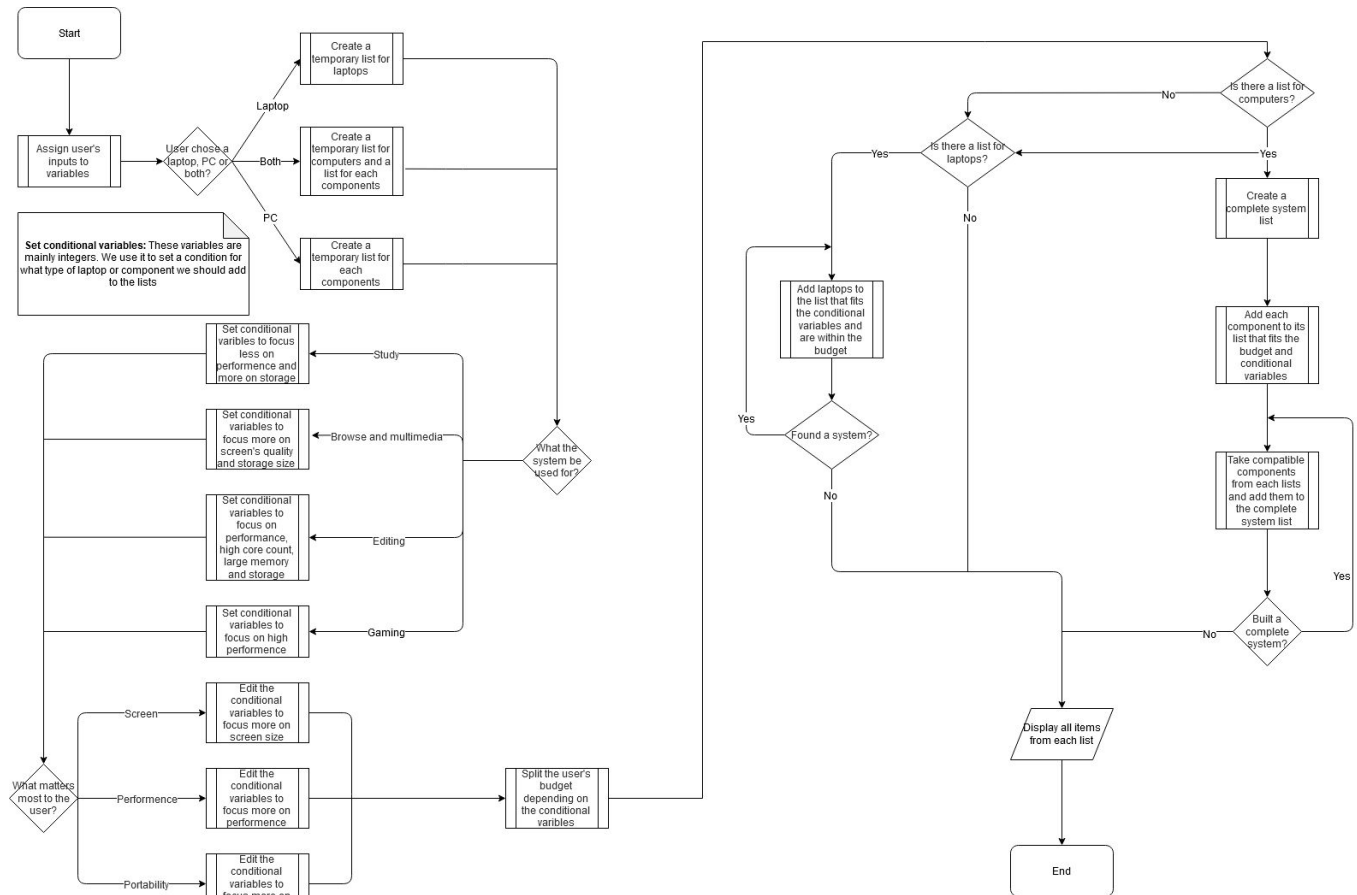
<b>Class</b>	Computers
<b>Method</b>	insertData
<b>Visibility</b>	Public
<b>Return Type</b>	boolean
<b>Parameters types</b>	String: name, double: price, Bitmap: img, String: brand, String:url, String[]: screen, ComputerType: cType, int: ramSize, int:ramSpeed, int: storageSize, StorageType: sType, int: cpuCores, boolean: dGPU
<b>Description</b>	This method inserts data into the database.

## 2.4 State Charts



## 2.5 Flowchart Diagram


This is a flowchart for `getResult(boolean[] userChoices)` method, which is the main function in our application:




## 2.6 User Interface Design





1 What device do you want?


  
Laptop  
☒


  
PC  
☐

2 What are you using your computer for?

  
Study  
☒

  
Browse & Multimedia  
☐


  
Editing & Montage  
☐

  
Gaming  
☐

3 What matters most to you?

  
Screen  
☐

  
Performance  
☐

  
Portability  
☒

4 What is your budget ?






Figure.1

*This is Home page With four Question and Search bar and windows buttons*



3 What matters most to you?

  
Screen  
☐

  
Performance  
☐

  
Convert to Tablet  
☒


4 What is your budget ?

From 400 SAR To 2500 SAR


Find Your Computer 😊

Result

Best Seller

  
RAYZEN GAMING PC  
3250 SAR

  
Touch 13 Dell XPS  
4100 SAR

  
Asus Gaming  
3240 SAR





Figure.2  
*Follow of the Home Page with result button and best seller*

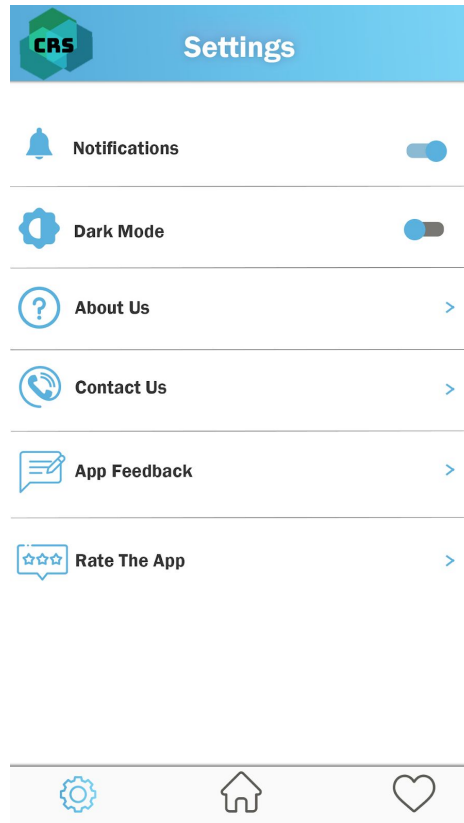


Figure.3  
*This is settings window with some options  
(notifications- dark mode-about us-contact us-app feedback-rate the app)*

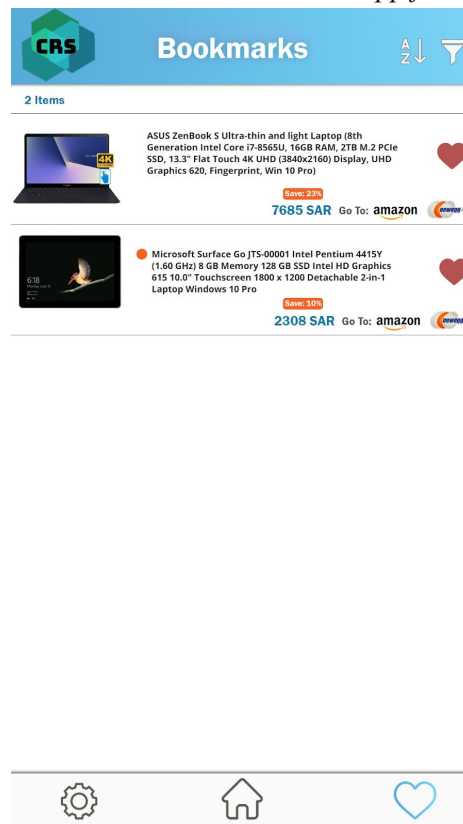


Figure.4

*This is bookmark window with sort and buttons*



Best Recommendation

A Z

↓

Filter

20 Results



HP Pavilion x360 15.6" HD 2 in 1 Touchscreen Laptop Home and Business Notebook Core i5-8265U, 12GB RAM, 512GB SSD, Quad-Core up to 3.90 GHz, USB-C, UHD Graphics 620, Keypad, WebCam, Win 10

Save: 23%

2450 SAR

Go To: [amazon](#)





Dell Inspiron 7000 2-in-1, 15.6" FHD Touch Display, Intel Core i5-8265U Upto 3.90GHz, 8GB RAM, 256GB NVMe SSD + 1TB HDD, HDMI, Card Reader, Wi-Fi, Bluetooth, Windows 10 Pro

Save: 23%

2551 SAR

Go To: [amazon](#)





HP ProBook x360 11 G3 EE 11.6" LCD 2 in 1 Notebook - Intel Pentium Silver N5000 Quad-core (4 Core) 1.10 GHz - 8 GB DDR4 SDRAM - 128 GB SSD - Windows 10 Home - 1366 x 768 - Convertible - Intel UHD

Save: 23%

2400 SAR

Go To: [amazon](#)






DELL Inspiron 14 5481 i5481-3083GRY-PUS Intel Core i3 8th Gen i345U (2.10 GHz) 8 GB Memory 128 GB SSD 256 GB HDD Intel UHD Graphics 620 14" Touchscreen 1366 x 768 Convertible 2-in-1 Laptop Windows 10

Save: 23%

2252 SAR

Go To: [amazon](#)





Microsoft Surface Go JTS-00001 Intel Pentium 4415Y 615 10.0" Touchscreen 1800 x 1200 Detachable 2-in-1 Laptop Windows 10 Pro

2566 SAR

Go To: [amazon](#)





Lenovo Flex 14 81EM000WUS Intel Core i3 8th Gen i3130U (2.20 GHz) 8 GB Memory 128 GB PCIe SSD Intel UHD Graphics 620 14" Touchscreen 1366 x 768 Convertible 2-in-1 Laptop Windows 10 Home 64-Bit

Save: 23%

1928 SAR

Go To: [amazon](#)








Figure.5

*This is the result window from the result button. with sort and buttons*




Asus zenbook s

A Z

↓

Filter

12 Results





ASUS ZenBook S, 13.3" UHD 4K Touch, 8th Gen Whiskey Lake Intel Core i7-8565U Processor, 16GB RAM, 512GB PCIe SSD, FP Sensor, Thunderbolt, Windows 10 Professional - UX391FA-XH74T Deep Dive Blue laptop

Save: 23%

4343 SAR

Go To: [amazon](#)







ASUS Laptop ZenBook S UX391UA-XB71-R Intel Core i7 8th Gen i550U (1.80 GHz) 8 GB LPDDR3 Memory 256 GB SSD Intel UHD Graphics 620 13.3" Windows 10 Pro 64-Bit

Save: 10%

4430 SAR

Go To: [amazon](#)







ASUS ZenBook S Ultra-thin and light Laptop (8th Generation Intel Core i7-8565U, 16GB RAM, 2TB M.2 PCIe SSD, 13.3" Flat Touch 4K UHD (3840x2160) Display, UHD Graphics 620, Fingerprint, Win 10 Pro)

Save: 23%

7685 SAR

Go To: [amazon](#)







ASUS ZenBook S Ultra-thin and light Laptop (8th Generation Intel Core i7-8565U, 16GB RAM, 1TB M.2 PCIe SSD, 13.3" Flat Touch 4K UHD (3840x2160) Display, UHD Graphics 620, Fingerprint, Win 10 Pro)

Save: 23%

6934 SAR

Go To: [amazon](#)







ASUS ZenBook S Ultra-thin and light Laptop (8th Generation Intel Core i7-8565U, 16GB RAM, 1TB M.2 SATA SSD, 13.3" Flat Touch 4K UHD (3840x2160) Display, UHD Graphics 620, Fingerprint, Win 10 Pro)

Save: 23%

5622 SAR

Go To: [amazon](#)






ASUS ZenBook S Ultra-thin and light Laptop (8th Generation Intel Core i7-8565U, 16GB RAM, 1TB M.2 SATA SSD, 13.3" Flat Touch 4K UHD (3840x2160) Display, UHD Graphics 620, Fingerprint, Win 10 Pro)

Save: 23%

6747 SAR

Go To: [amazon](#)










Figure.6

This is the result window form product search. with sort and buttons



Figure.7

This is filter option window with a lot of attributes

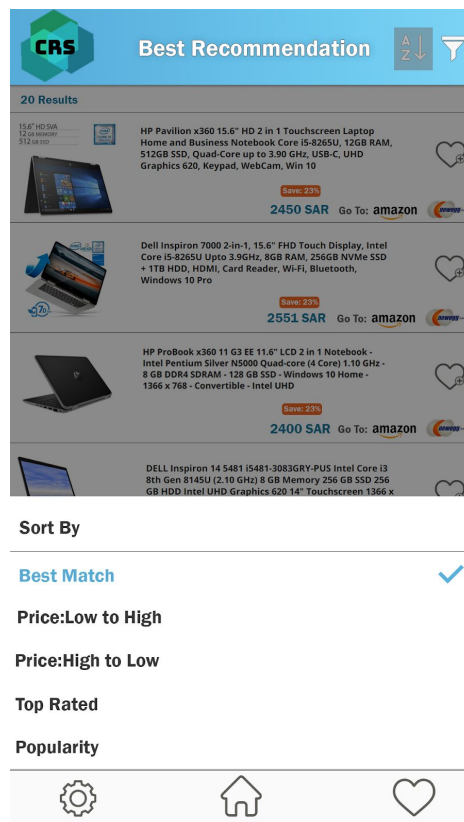


Figure.8

*This is sort option window with five options*

### **3. Conclusion**

*The purpose of this DD (Design Document) is to show the system of CRS in an architectural view with different diagrams, modules and show the user interface. Also Explain what each method does in the system.*

**GitHub Repository :** <https://github.com/Saad-BinMansour/CRS>