1. Problem Statement:

To study and analyse 4-5 web application on a particular domain and find out the following –

1. Domain and area of the problem

2. Decompose the problem- identify the components

3. Computing models (if any)

4. Draw zero level use-case diagram of the problem

5. Draw State Diagram of the problem

6. Abstractions-features (language, framework, Platform, etc.)

7. Other Features- Analytics, Widgets

8. Scripting: JavaScript Libraries, Functions, API's, Plug-in.

9. Quality factor: loading time, execution time, size

10. Other parameters: Advertising, SSL Certificates, Web Servers, payment gateways

11. Social Media buttons

12. Reference of the website

13. Any other relevant information

The main objective of this assignment is to understand the structure, features and properties of the backend of a web application. In this assignment we will also study how to make a generalized state diagram and a use case diagram after analysing 4-5 web applications of the same domain. The domain covered in this assignment will be 'Online Hotel Booking'.

2. Decomposition:

The domain of the web application chosen in this assignment is “Hotel Booking”. Decomposition is the method in which we can further understand the website and its individual parts. Below is the generalised diagram of Decomposition for a Hotel Booking Website:

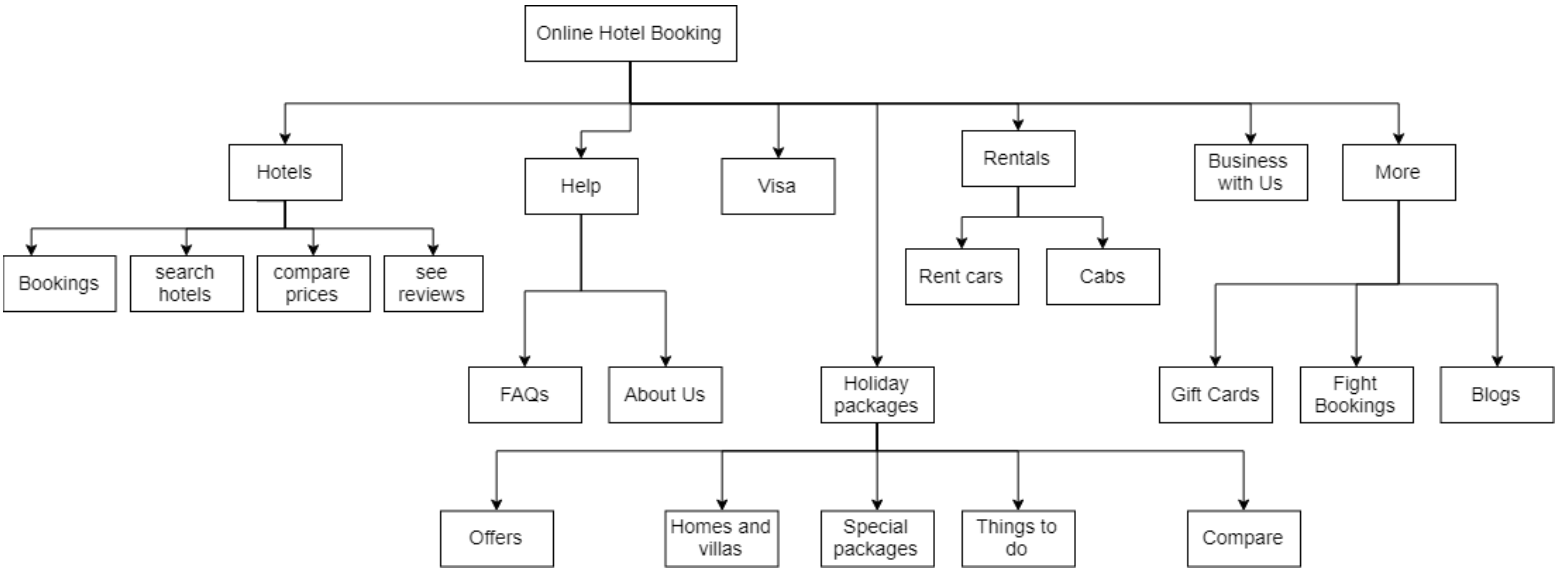

Fig.1 Decomposition of Online Hotel Booking Sites

3. Use Case Diagram:

A use case diagram consists of actors, a boundary and an external company. In this assignment the actors are the users of an online hotel booking website, Boundary is the things which a user has access to and the External company is the web application itself.

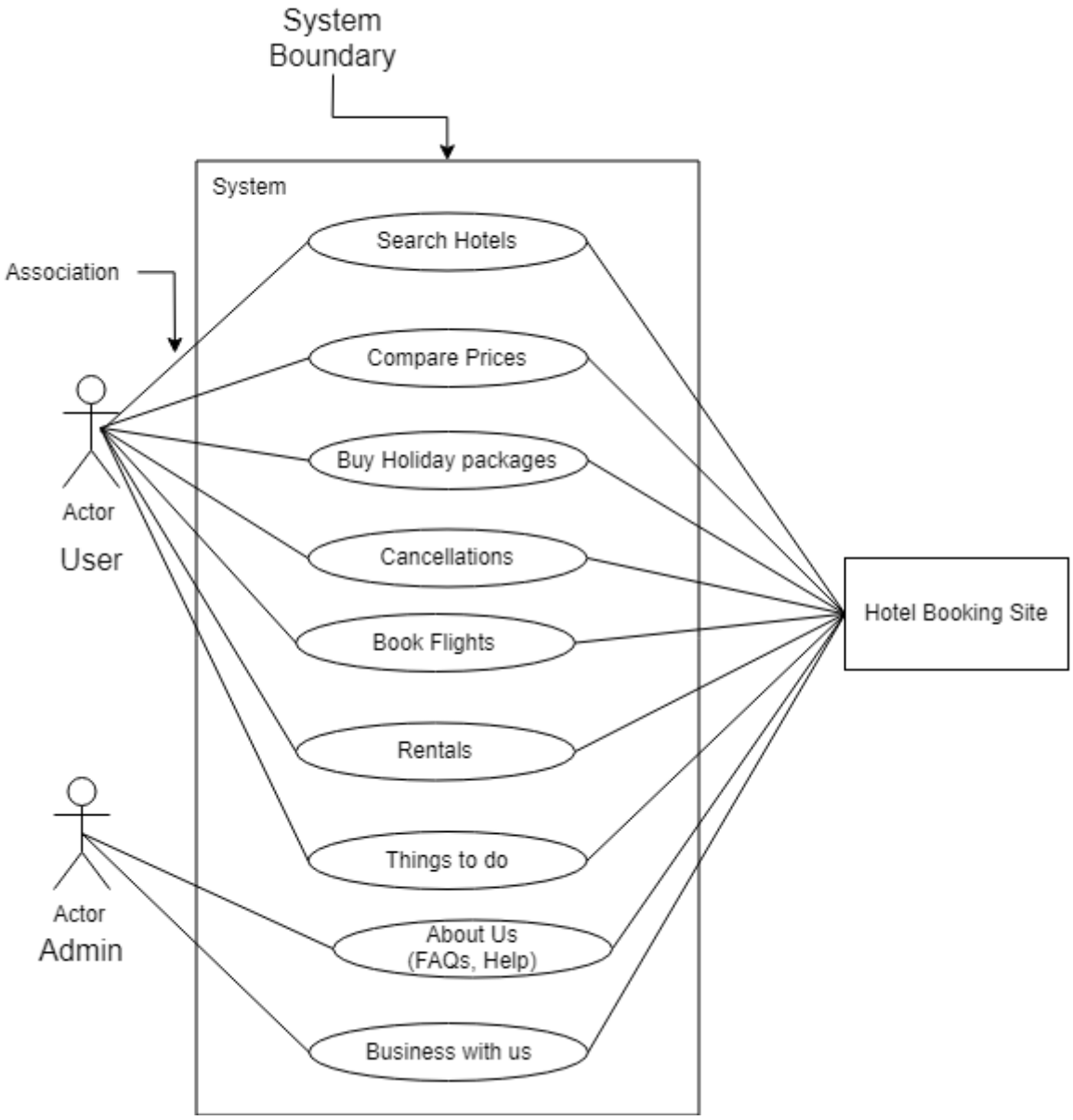

Fig.2 Use Case diagram

4. State Diagram:

It is used to represent the condition of the system or part of the system at finite instances of time. It's a behavioural diagram and represent the behaviour at finite transitions. It is used to model the dynamic behaviour of a class in response to time and changing external stimuli.

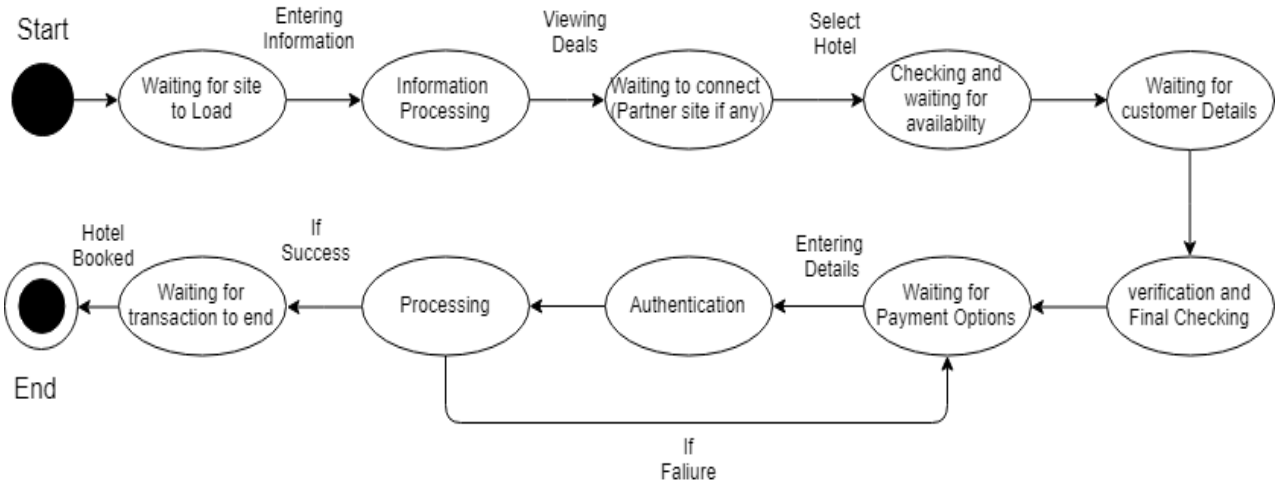

Fig.3 State Diagram

5. Properties and Patterns:

In patterns we analyse and study the tools used in the development (back end) of an online Hotel Booking web Application. Below is a list of 5 famous Hotel booking sites and their properties:

1. Agoda.com https://www.agoda.com

Analytics and Tracking - Soasta mPulse, MouseStats, Facebook Domain Insights, Google Analytics Google Conversion Tracking, DoubleClick Floodlight, Facebook Signal Global Site Tag, Bing Universal Event Tracking
Widgets - Tealium, Agoda, reCAPTCHA, Sitelinks Search Box, Workplace by Facebook Google Tag Manager
Language - Spanish HREF LANG, German HREF LANG, Thai HREF LANG, Chinese HREF LANG, English HREF LANG, French HREF LANG, German, Thai, Japanese HREF LANG, Korean HREF LANG, Russian HREF LANG, Arabic HREF LANG
Frameworks - ASP.NET, ASP.NET MVC, PHP, Perl, Facebook Domain Verification

Mapping - Google Maps API, Google Maps
Content Delivery Network – Akamai, Facebook CDN, AJAX Libraries API
JavaScript Libraries and Functions - jQuery UI, Facebook SDK, Facebook for Websites jQuery, Handlebars, Boomerang core-js, Babel, Webpack
Web servers - IIS
CSS Media Queries - Min Width, Max Width
Payment – Euro, Japanese Yen, Pound Sterling
Advertising - DoubleClick.Net, Google Remarketing, Drawbridge, DoubleClick Bid Manager, Tapad Facebook Custom Audiences
SSL Certificates - DigiCert SSL, SSL by Default

2. OYO.com https://www.oyorooms.com

Analytics and Tracking - Google Analytics, Google Universal Analytics
Widgets - Twitter Tweet Button, WebEx Panel
Content Delivery Network - jQuery CDN
JavaScript Libraries and Functions - jQuery
Email Hosting Providers - SPF
Web Hosting Providers - KDDI
Web Servers - Apache
SSL Certificates – GlobalSign, AlphaSSL

3. Trivago.com https://www.trivago.in

Analytics and Tracking - Soasta mPulse, Decibel Insight, DoubleClick Floodlight, Hotjar, Google Analytics, Google Conversion Tracking, Facebook Pixel, Twitter Website Universal Tag, Facebook Signal, Yahoo Dot, Yahoo Web Analytics, Facebook Conversion Tracking, Bing Universal Event Tracking, MediaMath, Global Site Tag, Google Conversion Linker, AppsFlyer, Naver Analytics
Widgets – reCAPTCHA, Google Tag Manager, Google No Translate, Fotolia
Language - Spanish HREF LANG, English HREF LANG, French HREF LANG, German HREF LANG, Thai HREF LANG, Chinese HREF LANG, Korean HREF LANG, Japanese HREF LANG, Russian HREF LANG, Arabic HREF LANG
Frameworks – PHP, Facebook Domain Verification
Mapping - Google Maps, Google Maps API

Content Delivery Network - GStatic Google Static Content, Akamai, Yahoo Image CDN
JavaScript Libraries and Functions - Facebook for Websites, Google API, Modernizr, jQuery, Webpack, core-js, Lightbox, Facebook SDK, lodash, Boomerang
Web Servers – Apache, nginx
Content Delivery Network – Gstatic Google Static Content
Advertising – Criteo, DoubleClick.Net, Taboola, Twitter Ads, Google Remarketing, Facebook, Custom Audiences, DoubleClick Bid Manager, Amazon Ad System, Amazon, Associates, RTB House, Turn, Outbrain, Zanox, MetaRail, Netaffiliation, TradeTracker Clicktripz, Google Floodlight Counter

4. TripAdvisor https://www.tripadvisor.in/

Analytics and Tracking - Effective Measure, LiveRamp, Rapleaf, DoubleClick Floodlight, Google, Analytics, comScore, Google Conversion Tracking, Yahoo Web Analytics Facebook Conversion Tracking, Facebook Domain Insights, Bing Universal, Event Tracking, Facebook Signal, SmarterTravel Media, Yahoo Dot, Lotame Crowd Control, Global Site Tag
Widgets – Survata, Qualaroo, Qualtrics Site Intercept, Bugcrowd, Google Font API, Smart App Banner, Google Tag Manager, Yoast Plugins, Font Awesome, Wordpress Plugins, Sitelinks Search Box, Elementor, reCAPTCHA, Google Identity Platform
Language - French HREF LANG, English HREF LANG, Spanish HREF LANG, German HREF LANG, Chinese HREF LANG, Thai HREF LANG, Japanese HREF LANG, Korean HREF LANG, Russian HREF LANG, Arabic HREF LANG
Frameworks – PHP, J2EE, Adobe ColdFusion, Placehold IT, Facebook Domain Verification, Amazon API Gateway
Mapping - Google Maps, Navigator GeoLocation
Content Delivery Network - GStatic Google Static Content, WordPress Grid, Facebook CDN, Fastly CDN, JS Cache
JavaScript Libraries and Functions – Lightbox, jQuery, Typeahead.js, Facebook for Websites Facebook SDK, jQuery NoConflict, HTML5 History API, Modernizr, Angular JS, jQuery Waypoints, core-js, zepto.js, Google API
Name Server - UltraDNS Neustar, Dyn DNS

Web Hosting Providers - Akamai Hosted, Verizon
CSS Media Queries - Min Width, Max Width

5. MakeMyTrip https://www.makemytrip.com

Analytics and Tracking - Omniture SiteCatalyst, Omniture Adobe Test and Target, Mouseflow, New Relic
Widgets – WebEngage, QuBit OpenTag, Google Font API
Languages - Hindi HREF LANG, English HREF LANG
Frameworks - Akamai Bot Manager, PHP
Content Delivery Network - Akamai Global Host, CloudFront, Akamai, GStatic Google Static Content
JavaScript Libraries and Functions – Sentry, jQuery, Raven JS
Name Server - UltraDNS neustar
Web Servers – Apache, nginx, Nginx 1.14

6. Patterns:

There are certain patterns which are common to the above websites under the following categories:

1. **Analytics and Tracking –** Facebook Conversion Tracking is used by 40% of them. 60% use other tools.
2. **Widgets –** 40% use Google Tag Manager, while the other 60% use various different tools.
3. **Languages** – 80% use English HREF LANG, 60% use Japanese, Korean, Chinese, Spanish HREF LANG.
4. **JavaScript Libraries and Functions –** 100% use jQuery in common along with others too.
5. **Name Server –** 40% use UltraDNS neustar in common along with others.
6. **Web Servers –** 60% of the above use Apache (web server) in common

7. Quality:

The quality of a web application will depend on its Loading time, Execution time, Page size, etc.

1. Agoda.com (https://www.agoda.com)

   Fully loading time – 5.1s

   Total page size – 1.74MB

   Requests – 117

   Page speed Score – C (70%)

2. OYO.com (https://www.oyorooms.com)

   Fully loading time – 4.2s

   Total page size – 2.04MB

   Requests – 81

   Page speed Score – E (59%)

3. Tripadvisor.com (https://www.tripadvisor.in/)

   Fully loading time – 12.8s

   Total page size – 3.15MB

   Requests – 434

   Page speed Score – D (62%)

4. Trivago.com (https://www.trivago.in)

   Fully loading time – 3.9s

   Total page size – 1.30MB

   Requests – 149

   Page speed Score – C (71%)

8. Conclusion:

In this assignment we understand the basics and concepts of state diagrams, its significance, zero level Use Case Diagrams, properties and patterns used in a web application. We also learnt the tools used in the backend of a website. This assignment also taught how to decompose a problem into certain parameters and sections.