CMSC 447
Software Requirements Specification (SRS)

Group 4 - */* No Comment*/*
Realty Map Filter

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1 Scope

1.1 Identification

This document applies to the program identified as the Realty Map Filtering (RMF) application. The version number as of April 5, 2018 is 1.0.0.

1.2 System overview

This application's purpose is to locate houses for sale across the United States (U.S.) that meet certain criteria defined by the user. These criteria include, but are not limited to, a location range, property data (e.g., market value), nearby schools, crime rates, and community types (e.g., urban, suburban, or rural). The results will be displayed on a Google Maps-style map using pins along with relevant details of the property listings.

This application will make requests to APIs from third-party solutions. We believe this will require security to prevent API results from being altered into false results. A possible method to avoid this is to use an HTTPS connection when the API is used.

As for personal information, our website will not be collecting any from the user, nor will we require a login. Therefore personal data should not be at risk.

2 Referenced documents

a. Software Development Plan (SDP), version 1.0.0 (March 29, 2018)
b. Software User Manual (SUM), version 1.0.0 (April 26, 2018)
c. *SOFTWARE ENGINEERING: A PRACTICAL APPROACH* – 8th Edition, Roger Pressman, ISBN-10: 0078022126, ISBN-13: 978-0078022128, McGraw-Hill, 2014
d. *BEGINNING SOFTWARE ENGINEERING*, 1st Edition, Rod Stephens, ISBN-10: 8126555378, ISBN-13: 978-8126555376, ASIN: 1118969146, Worx, 2015
e. *TCP/IP Illustrated, Volume 1: The Protocols*. W. Richard Stevens. ISBN 0-201-63346-9

3 Requirements

	Requirement Statements	Traceability	Thld	Obj	I	A	D	T
1.0	Geographic scope of user search criteria shall include the entire United States including Alaska and Hawaii.	KPP1/ Customer Need	50 states	All towns and cities			X	
1.0.1	Location of user search results shall be displayed on a digital map.	Derived	Location	Location & points of interest			X	
1.0.2	The digital map shall be scalable.	Derived	View up to 1-500 miles radius	Entire United States			X	
2.0	Available user search options shall be able to filter through use of six search criteria.	Derived	6	6				X
2.0.1	Acceptable search criteria shall be street address.	Derived	Mailing address	Mailing address				X
2.0.2	Acceptable search criteria shall be city	Derived	50%	100%				X
2.0.3	Acceptable search criteria shall be zip code.	Derived	5 digits	5 digits + 4 digit suffix				X
2.0.4	Acceptable search criteria shall be neighborhood	Derived	50%	100%				X
2.0.5	Acceptable search criteria shall be school	KPP2/ Customer need	Public Schools	Public & Private Schools				X
3.0	User search results shall display 20 results per page	Derived	20	20				X
3.0.1	Details of search results shall be displayed in a multi-page side window next to the map display.	KPP4	1 page	10 pages				X
3.0.2	Available search results information shall be real estate to buy, rent, or just sold based on user search criteria	Customer Need	Residential	Residential & Commercial				X

3.0.3	Results shall include zip code of real estate structure	Derived	5 digits	5 digits + 4 digit suffix				X
3.0.4	Results shall include cost of purchasing the property	Customer Need	Current Cost	Cost History				X
3.0.5	Results details shall include type of structure	Derived	Residential	Residential & Commercial				X
3.0.6	Results details shall include square feet of structure	Derived	Finished Square ft	Total Square ft				X
3.0.7	Results details shall include house address	Derived	Mailing Address	Mailing Address				X
3.0.8	Results details shall include lot square footage	Derived	100%	100%				X
3.0.9	Results details shall include number of bathrooms	Derived	Number of bathrooms	Number of full/half bathrooms				X
3.0.10	Results details shall include number of bedrooms	Derived	Number of bedrooms	Number of bedrooms				X
3.0.11	Search options shall include local schools	Customer Need	Public	Public & Private				X
3.0.12	Results shall include local school ratings	Customer Need	1-5 Rating	1-5 Rating				X
3.0.13	Results shall include crime rates	Customer Need	Neighbor-hood	City wide				X
3.1	Results shall be based upon a search from user inputs	Derived	1	6				X
4.0	The RMF shall utilize external interfaces to determine and display search results	Derived	1	4			X	
4.0.1	Redfin shall be used to to locate real estate addresses, prices, and, features of search results	Derived	1	3			X	
4.0.2	Google Maps shall be used to display the map and geographic location of search results	Derived	N/A	N/A			X	

4.0.3	SpotCrime shall be used to gather information about local crime rates to be used as a search option	Derived	N/A	N/A			X	
4.0.4	SpotCrime shall be used to gather information about local crime rates to be displayed as search results	Derived	N/A	N/A			X	
4.0.5	SchoolDigger shall be used to gather information about school location to be used as a search option	Derived	N/A	N/A			X	
4.0.6	SchoolDigger shall be used to gather information about school ratings to be used as a search option	Derived	N/A	N/A			X	
4.0.7	SchoolDigger shall be used to gather information about school location to be displayed as search results	Derived	N/A	N/A			X	
4.0.8	SchoolDigger shall be used to gather information about school ratings to be displayed as search results	Derived	N/A	N/A			X	
5.0	The RMF shall ensure that users will not receive viruses, trojan horses or malware through the use of this application.	Derived	Zero Infections	Zero Infections			X	
5.1.1	Software shall be compatible with Microsoft Windows 7 through 10	Customer Need	Microsoft 10	Microsoft 7 through 19				X
5.1.2	Software shall be compatible with Internet Explorer 11 or Google Chrome 66.0+	Derived	IE or Google Chrome	Both				X

3.1 Required states and modes

The following are the operating states of the Realty Map Filtering software:

- Off: the application is not operational and not available for use
- Idle: the application is operational and available but it is not in use
- Degraded: the application is operating but not in accordance with specifications
- Active: the application is fully operational, available and in use

The RMF will be in an offstate while debugging or development is taking place. It will be ready when it is connected to all the necessary APIs and servers but not in current use by a user. While the RMF is ready for use but not currently in use, it is in the idle state. During use, the RMF will be in an active state. It may enter a degraded state if the application was to become compromised by threats such as viruses or cyber attacks. Furthermore, the degraded state may also be caused by poor Internet connection on the user end or poor bandwidth. Lastly, the software will enter an off state if it is either discontinued by the development team, client after delivery or becomes compromised.

3.2 CSCI capability requirements

3.2.1 (CSCI capability)

Functional Group 1: Map Function.

Requirements 1.0, 1.0.1, 1.0.2

Functional Group 2: Search Function.

Requirements 2.0, 2.0.1, 2.0.2, 2.0.3, 2.0.4, 2.0.5

Functional Group 3: Display Results Function

Requirements 3.0, 3.0.1, 3.0.2, 3.0.3, 3.0.4, 3.0.5, 3.0.6, 3.0.7, 3.0.8, 3.0.9, 3.0.10, 3.0.11, 3.0.12, 3.0.13, 3.1

Functional Group 4: External Interface Function

This application will be capable of finding a suitable listing of houses for a client based on given inputs such as desired house attributes, nearby schools, crime rates, etc. It will be capable of sorting the results by most relevant to given inputs. The requirements are listed in detail in Section 3 of this document.

If the application should run into the unexpected case of returning no results as the search has resulted in no matches, it will inform the user of this. This is to prevent the user from getting confused or assuming that the application has malfunctioned or is still computing. Any kind of error will also result in informing the user what went wrong, along with suggested actions to correct the mistake if it was caused by the user.

3.3 RMF external interface requirements

3.3.1 Interface identification and diagrams

The RMF application utilizes the following external interfaces while it is in the Active Operating State: External web client browser, APIs, Server operating system, HMI peripherals.

The following APIs will provide us with the external data that the RMF will filter and return to the user:

Redfin: real estate location, pricing and details
SpotCrime: Crime rates
SchoolDigger: School location and ratings
Google Map: Map display

3.3.2 (Project-unique identifier of interface)

Communication protocol will adhere to the regulations as they appear in *TCP/IP Illustrated*. This document is referenced in Section 2.

3.4 CSCI internal interface requirements

All internal RMF application interfaces have been left to the design.

3.5 CSCI internal data requirements

The RMF is a web application and must run on a web browser (e.g., Google Chrome, Firefox, Safari).

3.6 Adaptation requirements

The user must have Flask and Python installed on the local machine that is running the RMF software.

3.7 Security and privacy requirements

The RMF shall ensure that users will not receive viruses or malware through use of the application.

3.8 CSCI environment requirements

The RMF shall be compatible and operate identically on Microsoft Windows 7 through Windows 10 operating systems. The RMF shall be compatible with the Internet Explorer and Google Chrome Internet browsers.

3.9 Computer resource requirements

3.9.1 Computer hardware requirements

While the RMF application does not require one specific server hardware configuration to operate efficiently, the below list of computer hardware represents the recommended minimum recommended server hardware and performance:

1TB 5,400 RPM hybrid drive.

CPU: 2.3 GHz Intel Core i5-6300HQ (quad-core, 3MB Cache, up to 3.2GHz)

Graphics: Nvidia GeForce GTX 960M (4GB GDDR5 RAM), Intel HD Graphics 530

RAM: 8GB DDR3L (1,600MHz)

Storage: 1TB 5,400 RPM hybrid drive w/ 8GB cache

Ports: 3 x USB 3.0; HDMI; SD card reader; headphone/microphone jack

Connectivity: 802.11ac; Bluetooth 4.0; gigabit ethernet

3.9.2 Computer hardware resource utilization requirements

There are no specific hardware resource utilization requirements for the RMF. Allocation of server resources will be left to the network administrator to manage.

3.9.3 Computer software requirements

The RMF application shall require the minimum server software configuration to operate efficiently:

- Microsoft Windows 7 through 10
- Internet Explorer 11 or Google Chrome 66.0+ Internet browser
- Symantec Endpoint Protection Version 12.1.6
- Redfin API
- Google Maps API Version 3.32
- SpotCrime API
- SchoolDigger API Version 1.1

3.9.4 Computer communications requirements

The RMF application software does not have any specific communications requirements in order to be functional. RMF only requires a connection to the Internet at the server where it resides. Specific Internet interfaces, throughput performance levels and network configuration will be left to network administrators to manage within the constraints of their operating budgets and internal operations guidelines.

Figure 1: Example RMF Server to user topology

3.10 Design and implementation constraints

The RMF is constrained to only having access to free APIs. These free APIs limit the number of calls that can be made in a single day with the lowest value being 500. As a result, the potential maximum number of searches in full operational status that can be made in a single day will also be 500.

3.11 Personnel-related requirements

Personnel who will operate the RMF must have a basic understanding of the following:

- Basic understanding of how to navigate a Internet Web Browser to access the application
- Familiarity with filtering tools
- United States housing descriptions such as addresses and zip codes

3.12 Training-related requirements

Training for the Realty Map Filtering is in accordance with the Realty Map Filtering User Manual provided separately.

3.13 Precedence and criticality of requirements

All requirements listed in Section 3 have equal weight.

4 Qualification provisions

This section shall define a set of qualification methods and shall specify for each requirement in Section 3 the method(s) to be used to ensure that the requirement has been met:

a. Demonstration: The operation of the RMF, or a part of the RMF, that relies on observable functional operation not requiring the use of instrumentation, special test equipment, or subsequent analysis.
    - Geographic scope of user search criteria shall include the entire United States including Alaska and Hawaii.
    - Location of user search results shall be displayed on a digital map.
    - The digital map shall be scalable.
b. Test: The operation of the RMF, or a part of the RMF, using instrumentation or other special test equipment to collect data for later analysis.
    - Available user search options shall be able to filter through use of six search criteria.
    - Search criteria
        - Acceptable search criteria shall be street address.
        - Acceptable search criteria shall be city
        - Acceptable search criteria shall be zip code.
        - Acceptable search criteria shall be neighborhood
        - Acceptable search criteria shall be school
    - Search results
        - User search results shall display 20 results per page
        - Details of search results shall be displayed in a multi-page side window next to the map display.
        - Available search results information shall be real estate to buy, rent, or just sold based on user search criteria
        - Results shall include zip code of real estate structure
        - Results shall include cost of purchasing the property
        - Results details shall include type of structure
        - Results details shall include square feet of structure
        - Results details shall include house address
        - Results details shall include lot square footage
        - Results details shall include number of bathrooms
        - Results details shall include number of bedrooms
        - Search options shall include local schools
        - Results shall include local school ratings
        - Results shall include crime rates
        - Results shall be based upon a search from user inputs

5 Notes

The Fibonacci scale is used in an Agile programming environment, and specifically in this project, in order to denote a level of difficulty for a given task. It is designed to conceptualize iterative development, known as sprints, and the scale begins at 0 and is continuous in steps as in the Fibonacci sequence (1, 2, 3, 5, 8, ...). The higher the number, the more complex the task.

Acronyms

API - Application Programming Interface

CSCI - Computer Software Configuration Item

HMI - Human Machine Interface or UI

HTTP - Hypertext Transfer Protocol

HTTPS - Hypertext Transfer Protocol Secure (HTTP over TLS)

IDE - Integrated Development Environment

RMF - Realty Map Filter

SDD - Software Design Description

SDP - Software Development Plan

SRS - Software Requirements Specification

STD - Software Test Description

STR - Software Test Report

SUM - Software User Manual

TLS - Transport Layer Security (protocol)

UI - User interface