SE 3XA3: Module Interface Specification
Google Images Downloader

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Introduction

This document shows the complete specification for implementing all modules of the Google Images Downloader program.

Date	Name	Version	Notes
1/21/2020	Joshua	1.0	Created document
3/11/2020	Sam	1.1	Set up format of document
3/11/2020	Sam	1.1.1	Set up skeleton of each module
3/11/2020	Joshua	1.1.2	Input and Navigate Page Module
3/12/2020	Nick	1.1.3	Search Query and Main Module
3/13/2020	Sam	1.1.4	Output Module
3/13/2020	Joshua, Sam, Nick	1.2	General Edits

Table 1: **Revision History**

Input Format Module

Module

Input

Uses

None

Syntax

Exported Types

None

Exported Constants

None

Exported Access Programs

Routine name	In	Out	Exceptions
userInput	N/A	dict	InvalidParam, MissingParam

Semantics

Environmental Variables

- Keyboard

State Variables

None

State Invariant

None

Assumptions & Design Decisions

- The `userInput` method is called by Main before any other method.

Access Routine Semantics

userInput():

- output: $out :=$ A dictionary (key:value pair) of parameters and their values. The keys are the parameters and the values are the user input.

- exception: $exc :=$ (required parameter missing $\Rightarrow MissingParam$ | improper format for a parameter $\Rightarrow InvalidParam$)

Local Functions

keywordFromFile: string $\rightarrow$ dict

keywordFromFile(s) $\equiv$ Reads in file s of parameters and their associated values.

exception: exc := (can't find file $\Rightarrow$ *InvalidFileName* | can't read file $\Rightarrow$ *UnableToParseFile* | required parameter missing $\Rightarrow$ *MissingParam* | improper format for a parameter $\Rightarrow$ *InvalidParam*)

Search Query Module

Module

SearchQuery

Uses

None

Syntax

Exported Types

None

Exported Constants

None

Exported Access Programs

Routine name	In	Out	Exceptions
buildURL	dict of string	string	None

Semantics

Environmental Variables

None

State Variables

None

State Invariant

None

Assumptions & Design Decisions

- All input arguments stored in the dictionary of strings are correct and in the proper format

Access Routine Semantics

buildURL(dS):

- output: out := "https://www.google.com/search?q=&espv=2&sxsrf=ACYBGNSwqBUElVjmEWOTu3-

  mXPnReqFoLw:1581376760401&source=lnms" + buildURLParam(dS) + "isch&sa=X&ved=
  2ahUKEwiY7bzAj8jnAhUQjq0KHbXwBEYQ_AUoAXoECBMQAw&biw=838&bih=880"

- exception: none

Local Functions

buildURLParam: dict of string $\rightarrow$ string
buildURLParam$(dS) \equiv s$ such that:

    $s = $ ""

    for all i in dS:

        $s = s + i$

Navigate Page Module

Module

NavigatePage

Uses

None

Syntax

Exported Types

None

Exported Constants

None

Exported Access Programs

Routine name	In	Out	Exceptions
getImageURL	string, $\mathbb{Z}$	list of string	None

Semantics

Environmental Variables

State Variables

None

State Invariant

None

Assumptions & Design Decisions

- The link passed into the `getImageURL` method is correct and corresponds to a real link.

- The user has setup the program correctly (correct chromedriver in right location, installed selenium, put correct location of Google Chrome binary).

Access Routine Semantics

getImageURL(s, n):

- output: $out :=$ a list ($urls$) of image URLs from s where $|urls| = n$.

- exception: None

Output Format Module

Module

Output

Uses

None

Syntax

Exported Types

None

Exported Constants

None

Exported Access Programs

Routine name	In	Out	Exceptions
downloadImages	list of string, string, string	None	None

Semantics

Environmental Variables

- Screen

State Variables

None

State Invariant

None

Assumptions & Design Decisions

- The first string parameter (the download location) in the `downloadImages` method is optional and has a default value ("./Images").

- The `createDirectory` method creates a directory with the file path loc + "/" + key.

Local Functions

createDirectory(loc, key): ϵ
createDirectory(loc, key) $\equiv$ Null

Access Routine Semantics

downloadImages(*lst*, *loc*, *key*):

- output: save each image represented by a string in *lst* and save it to the folder created by the `createDirectory` method.

- exception: none

Main Module

Module

Main

Uses

Input, SearchQuery, NavigatePage, Output

Syntax

Exported Types

None

Exported Constants

None

Exported Access Programs

None

Semantics

Environmental Variables

None

State Variables

None

State Invariant

None

Assumptions & Design Decisions

- The main function in the Main module is used to call all the other modules in order to run them in the right order. The main function will call the modules in the following order: Input, SearchQuery, NavigatePage, Output.

Access Routine Semantics

None

Local Functions

main: $\epsilon \to \epsilon$
main() $\equiv$ Null