Improving Visualization Knowledge (VisKo)

Candidate Classes and Responsibilities

Version <1.0>

2/21/14

Document Control

Approval

The Guidance Team and the customer shall approve this document.

Document Change Control

|  |  |
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Distribution List

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Change Summary

The following table details changes made between versions of this document

|  |  |  |  |
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| Version | Date | Modifier | Description |
| 1.0 | 2/20/14 | Maria Cortes, Manuel Dosal, Marcela Vazquez | Added candidate classes, and section 1.3, definitions, acronyms and abbreviations. |
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# Introduction

<< This section gives introductory information regarding the project and the contents of this document. Identify the project. Indicate what the document contains and who the intended audience is. Describe the sections of the document>>

## Purpose and Intended Audience

## Scope of product

## Definitions, acronyms and abbreviations

This section is divided into 3 subsections: Definitions, Acronyms, and Abbreviations. Each subsection will help the reader understand definitions, acronyms and abbreviations used within this document.

### Definitions

|  |  |
| --- | --- |
|  | **DEFINITION** |
| Application Programming Interface (API) | An application-programming interface describes the names and signatures of a software or hardware system with the purpose of describing how to invoke or use it. |
| Navigation Side Bar | A user interface element within a webpage that contains links to other sections of the website. |
| Pipeline | An ordered sequence of executable web services that generate visualizations. The VisKo API translates user submitted Visualization Queries into sets of Pipelines. |
| Privileged User | A user that is defined as the owner of the system. A privileged user sets up the system as well as manages the system through various tasks. |
| Query | A formal request for the generation of a visualization described in terms of a Visualization Abstraction, Viewer Set, Input Format, and Input Data Type. A query and a pipeline provide equal forms of expressivity, but the query is declarative. |
| Regular User | A user that comes to the system to get desired visualizations based on some given data. |
| Services | A web-based tool kit used to generate visualizations. |
| User | A negotiator, a human agent, who uses or will use the VisKo system. Two different types; privileged user and registered user. |
| Viewer | A is a program that presents visualizations. |
| Viewer Set | A group of viewers. |
| VisKo API | A VisKo application-programming interface version 7.0 that specifies how specific hardware components work with each other. |
| Visualization | A presentation of information that is being presented through graphs and static images, depending on the service. Visualizations are generated by queries in this context. |
| Visualization Abstraction | Visualization geometry such as isosurfaces, isolines (i.e., contour lines), points, volumes, polygons, grids, etc. |
| Visualization Knowledge (VisKo) | A system that enables users to generate visualizations, such as graphs or static images, by submitting queries. |
| Visualization Type | A finished visualization of a query. |
| Wrapped Services | Services that can be added to the system |

### Acronyms­­

|  |  |
| --- | --- |
| **TERM** | **DEFINITION** |
| CRC | Class Responsibilities Collaboration |
| GUI | Graphical User Interface |
| ID | Identifier |
| URL | Uniform Resource Locator |
| VisKo | Visualization Knowledge |

### Abbreviations

|  |  |
| --- | --- |
| **TERM** | **DEFINITION** |
| App | Application |
| e.g. | For example |
| etc. | Etcetera |
| i.e. | In other words |

## Overview

## References

[1] Cheon, Yoonsik,*Classes, Responsibilities and Collaborations (CRC) Overview.* [Microsoft Power Point] El Paso, TX, 2014.

[2] Guidance Team, “Classes, Responsibilities, and Collaborations Template,” El Paso, TX, 2014.

[3] Guidance Team, “VisKo Software Requirements Specification,” El Paso, TX, 2014

# Process Description

<< Describe what process was carried out in order to develop section 3 of this document.

Enumerate the techniques and heuristics used. Identify any assumptions made, or constraints identified during the process in general. >>

# Candidate Classes and Responsibilities

## Candidate Classes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Class** | **Noun Phrase** | **Obvious** | **Unsure** | **Discarded** | **Comments** |
| Database | Update DB | ✓ |  |  | Handles all the database calls |
| Error | Error | ✓ |  |  | Class that contains all errors in the system. |
| ExecutionQueue | Pipeline Execution Queue | ✓ |  |  | Class that contains all executed pipelines |
| GUIAccountActivationConfirmation | Account activation confirmation page | ✓ |  |  | GUI class for account activation confirmation page |
| GUIAnalizePipelines | Analyze Pipelines element/page | ✓ |  |  | GUI class for analyze pipelines page |
| GUIAnalizeQuieries | Analyze Queries element/page | ✓ |  |  | GUI class for analyze queries page |
| GUIAnalizeServices | Analyze Services element/page | ✓ |  |  | GUI class for analyze services page |
| GUIChooseQueryStyle | Choose Query Style page | ✓ |  |  | GUI class for choose query style page |
| GUIConfigureAccount | Configure Account page | ✓ |  |  | GUI class for configure account page |
| GUIEditConverter | Edit Converter page | ✓ |  |  | GUI class for edit converter page |
| GUIEditFilter | Edit Filter page | ✓ |  |  | GUI class for edit filter page |
| GUIEditMapper | Edit Mapper page | ✓ |  |  | GUI class for edit mapper page |
| GUIEditPipelineParameters | Edit Pipeline Parameters page | ✓ |  |  | GUI class for edit pipeline parameters page |
| GUIEditTransformers | Edit Transformer page | ✓ |  |  | GUI class for edit transformers page |
| GUIEditViewer | Edit Viewer page | ✓ |  |  | GUI class for edit viewer page |
| GUIEditViewerSet | Edit Viewer Set page | ✓ |  |  | GUI class for edit viewer set page |
| GUIGuestWelcome | Guest Welcome page | ✓ |  |  | GUI class for Guest Welcome page |
| GUIPasswordRecovery | Password Recovery page | ✓ |  |  | GUI class for Password Recovery page |
| GUIPrivilegedNavigation | Privileged User Navigation | ✓ |  |  | GUI class that implements the Privileged User navigation |
| GUIPrivilegedUSerHome | Privileged User home page | ✓ |  |  | GUI class for privileged user Home page |
| GUIPrivilegeHeading | Privilege user heading | ✓ |  |  | Class for privilege User Heading |
| GUIRegister | Register page | ✓ |  |  | GUI class for Register page |
| GUIRegularHeading | Regular user heading | ✓ |  |  | Class for Regular User Heading |
| GUIRegularNavigation | Regular User Navigation | ✓ |  |  | GUI class that implements the Regular User Navigation. |
| GUIRegularUserHome | Regular User Home Page | ✓ |  |  | GUI class for Regular User Home page |
| GUISearchQueries | Search Queries element/page | ✓ |  |  | GUI class for Search Queries page |
| GUISearchUSers | Search Users element/page | ✓ |  |  | GUI class for Search Users page |
| GUISelectOperation | Select Operation page | ✓ |  |  | GUI class for Select Operation page |
| GUISelectPipeline | Select Pipelines page | ✓ |  |  | GUI class for Select Pipeline page |
| GUISetQueryParameters | Set Query Parameters page | ✓ |  |  | GUI class for Set Query Parameters |
| GUISpecifyHistory | Specify Criteria page (history) | ✓ |  |  | GUI class for Specify History Criteria page |
| GUISpecifyPipeline | Specify Criteria page (pipelines) | ✓ |  |  | GUI class for Specify Pipeline Criteria page |
| GUISpecifyService | Specify Criteria page (Services) | ✓ |  |  | GUI class for Specify Service Criteria page |
| GUIViewArguments | View Arguments page | ✓ |  |  | GUI class for View Arguments page |
| GUIViewDetailsHistory | View Details page (history) | ✓ |  |  | GUI class for View History Details page |
| GUIViewDetailsPipeline | View Details page (pipeline) | ✓ |  |  | GUI class for View Pipeline Details page |
| GUIViewDetailsService | View Details page (service) | ✓ |  |  | GUI class for View Service Details page |
| GUIViewResult | View Result page | ✓ |  |  | GUI class for View (visualization) Results page |
| Module | VisKo Module, VisKo module script | ✓ |  |  | Class to communicate with VisKo module |
| Pipeline | Pipeline | ✓ |  |  | Class to contain pipeline information, etc. Defined as sequence of services |
| PrivilegedUser | Privileged User | ✓ |  |  | Subclass of User. Class to contain privileged user information, and special features. |
| Query | Query | ✓ |  |  | Class to contain query information, and special features of query. |
| RegularUser | Regular User | ✓ |  |  | Subclass to contain information for regular user. |
| Service | Service | ✓ |  |  | Class that contains all services information, and special features of service. |
| Rule | Rules | ✓ |  |  | A class containing a set of rules for designating a service as a transformer, filter or mapper. |
| Statistics | Statistics | ✓ |  |  | Class containing system statistics, such as most common queries, pipelines, etc. |
| Toolkit | Toolkit, toolkits | ✓ |  |  | A class that contains all the information of a toolkit. |
| User | Users, User, | ✓ |  |  | An abstract class that contains information of users |
| VisKoAPIInterface | VisKo API | ✓ |  |  | Interface class, to interact with VisKo API |
| Visualization | Visualization | ✓ |  |  | A class containing all information of a visualization. |
| Visualization Query | Visualization query | ✓ |  |  | A class containing all information of a visualization query |
|  | Abstraction dropdown list |  |  | ✓ | Attribute of GUISpecifyPipeline class, GUISearchQuery class, and GUISpecifyService class, and GUI SpecifyHistory class |
|  | Account status |  |  | ✓ | Attribute GUISearchUsers class and RegularUser |
|  | Account Status drop down list |  |  | ✓ | Attribute GUISearchUsers class |
|  | Active |  |  | ✓ | Attribute of RegularUser |
|  | Affiliation drop down list |  |  | ✓ | Attribute GUISearchUsers class |
|  | Affiliation/s |  |  | ✓ | Attribute of RegularUser |
|  | Analyze Queries Element |  |  | ✓ | Attribute of GUIPrivilegeNavigation class |
|  | Analyze Pipelines Element |  |  | ✓ | Attribute of GUIPrivilegeNavigation class |
|  | Analyze Users Element |  |  | ✓ | Attribute of GUIPrivilegeNavigation class |
|  | Bar graph |  |  | ✓ | Attribute of Statistics class |
|  | Brief Description field |  |  | ✓ | Attribute of GUIViewerSet class |
|  | Browsers |  |  | ✓ | Requirement about implementation (not relevant to classes) |
|  | Calculated values |  |  | ✓ | Attribute of Pipeline class |
|  | Change Email section |  |  | ✓ | Attribute of GUIConfigureAccount class |
|  | Change Password section |  |  | ✓ | Attribute of GUIConfigureAccount class |
|  | Collapse button |  |  | ✓ | Attribute of GUIChooseQueryStyle |
|  | Commit button |  |  | ✓ | Attribute of GUIEditMapper class |
|  | Converter |  |  | ✓ | Attribute of GUIEditConverter class and Service class |
|  | Configure Account Element |  |  | ✓ | Attribute of GUIRegular Navigation class |
|  | Converters drop down list |  |  | ✓ | Attribute of GUISelectOperation class |
|  | Create Account button |  |  | ✓ | Attribute GUIRegister class |
|  | Current Password |  |  |  | Attribute of User class |
|  | Data Format dropdown list |  |  | ✓ | Attribute of Edit Mapper, Edit Converter, Edit Transformer, and Edit Filter pages |
|  | Data Types, Type, Dataset |  |  | ✓ | Attribute of Edit Mapper, Edit Converter, Edit Transformer, and Edit Filter |
|  | Date frequency |  |  | ✓ | Attribute of Pipeline class |
|  | Date Range Calendar, Date, date range, |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Delete button |  |  | ✓ | Attribute GUISpecifyService class, GUISelectOperation class |
|  | Documentation URL field |  |  | ✓ | Attribute GUIEditMapper class, GUIEditConverter class, GUIEditTranformer class, GUIEditFilter class |
|  | Edit button |  |  | ✓ | Attribute GUISpecifyService class, GUISelectOperation class |
|  | Edit service page |  |  | ✓ | It’s very general and its functions are implemented in other classes. |
|  | Email, email address |  |  | ✓ | Attribute of User class |
|  | Empty pipeline set |  |  | ✓ | Attribute of Error class |
|  | End Date section |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Entered drop down information |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Error drop down list |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Error types |  |  | ✓ | Attribute Error Class |
|  | Error logs |  |  | ✓ | General Error Message used for all errors [incorrect password, other errors, etc] |
|  | Expand button |  |  | ✓ | Attribute of GUIChooseQueryStyle |
|  | Filter |  |  | ✓ | Attribute of Service |
|  | Filters drop down list |  |  | ✓ | Attribute of GUIEditFilter |
|  | Forgot Password link |  |  | ✓ | Attribute of GUIGuestWelcome class, and GUIAccountActivation |
|  | Frequency of service errors |  |  | ✓ | Attribute of Statistics class |
|  | Functions of the system |  |  | ✓ | Very general, not a class. |
|  | Home element |  |  | ✓ | Attribute of GUIPrivilegedNavigation class, and GUIRegularNavigation |
|  | Image |  |  | ✓ | Attribute of ExecutionQueue |
|  | Inaccessible input data URL error |  |  | ✓ | Attribute of Error class |
|  | Incorrect Current Password |  |  | ✓ | Attribute of Error class |
|  | Input data format |  |  | ✓ | Attribute of GUISpecifyPipeline,GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Input data type |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Input data type drop down list |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Input data URL |  |  | ✓ | Attribute of Error class |
|  | Input dataset |  |  | ✓ | Attribute GUIEditMapper class, GUIEditConverter class, GUIEditTranformer class, GUIEditFilter class |
|  | Input format drop down list |  |  | ✓ | Attribute GUIEditMapper class, GUIEditConverter class, GUIEditTranformer class, GUIEditFilter class |
|  | Input URL dropdown list |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Local file system |  |  | ✓ | Attribute of GUIViewResult class |
|  | Location |  |  | ✓ | Attribute of GUIViewResult |
|  | Login button |  |  | ✓ | Attribute of GUIGuestWelcome class |
|  | Logout button |  |  | ✓ | Attribute of GUIRegularHeading, GUIPrivilegeHeading class |
|  | Malformed URI error |  |  | ✓ | Attribute of Error class |
|  | Manage Services element |  |  | ✓ | Attribute of GUIRegularNavigation class |
|  | Mapper |  |  | ✓ | Attribute of Service class |
|  | Mappers drop down list |  |  | ✓ | Attribute of GUIEditMapper class |
|  | MD5 algorithm |  |  | ✓ | Requirement about implementation, not a class. |
|  | Mobile web browsers |  |  | ✓ | Requirement about implementation, not a class. |
|  | Most common input data type |  |  | ✓ | Attribute of Statistics class |
|  | Most common input data type specified |  |  | ✓ | Attribute of Statistics class |
|  | Most common input format |  |  | ✓ | Attribute of Statistics class |
|  | Most common input format specified |  |  | ✓ | Attribute of Statistics class |
|  | Most common viewer set specified |  |  | ✓ | Attribute of Statistics class |
|  | Most common visualization abstraction |  |  | ✓ | Attribute of Statistics class |
|  | Most common visualization abstraction specified |  |  | ✓ | Attribute of Statistics class |
|  | Most generated output format |  |  | ✓ | Attribute of Statistics class |
|  | Most generated output type |  |  | ✓ | Attribute of Statistics class |
|  | Most generated visualization abstraction |  |  | ✓ | Attribute of Statistics class |
|  | Most ingested input format |  |  | ✓ | Attribute of Statistics class |
|  | Most ingested input type |  |  | ✓ | Attribute of Statistics class |
|  | Most popular pipeline |  |  | ✓ | Attribute of Statistics class |
|  | Most popular query |  |  | ✓ | Attribute of Statistics class |
|  | No pipeline results error |  |  | ✓ | Attribute of Error |
|  | Operation drop down list |  |  | ✓ | Attribute GUIEditMapper class, GUIEditConverter class, GUIEditTranformer class, GUIEditFilter class |
|  | Output format drop down list |  |  | ✓ | Attribute of GUIEditTranformer class |
|  | Output Data Type drop down list |  |  | ✓ | Attribute of GUIEditTranformer class |
|  | Parameter values |  |  | ✓ | Too general, parameters are broken down, in different classes. |
|  | Password |  |  | ✓ | Attribute of User class |
|  | Pipeline errors |  |  | ✓ | Attribute of Error class |
|  | Pipeline row |  |  | ✓ | Attribute of GUISelectPipelines |
|  | Pipeline Statistics |  |  | ✓ | Attribute of statistics class |
|  | Pipelines options |  |  | ✓ | Attribute of GUISelectPipelines class |
|  | Privileged User page |  |  | ✓ | Very general, is divided into classes of GUI. |
|  | Query Details section. |  |  | ✓ | Attribute of GUISearchQuery |
|  | Query errors |  |  | ✓ | Attribute of Error class |
|  | Query parameters |  |  | ✓ | Attributes of Query class |
|  | Radio button |  |  | ✓ | Attribute of GUISelectOperation class |
|  | Recover button |  |  | ✓ | Attribute of GUIPasswordRecovery class |
|  | Register button |  |  | ✓ | Attribute of GUIGuestWelcome Page class |
|  | Registration Information |  |  | ✓ | Attribute of GUIRegister class |
|  | Regular User Heading |  |  | ✓ | Attribute of Regular User page |
|  | Regular user’s account status |  |  | ✓ | Attribute of RegularUser class |
|  | Remove button |  |  | ✓ | Attribute of GUISelectPipelines class |
|  | Required field/s |  |  | ✓ | Attribute for different classes, that need required fields (i.e. GUIRegister) |
|  | Result |  |  | ✓ | Attribute of Visualization |
|  | Results row |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Results section |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Run button |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Save button |  |  | ✓ | Attribute of of GUIEdit PipelineParemeters |
|  | Search button |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Search Criteria |  |  | ✓ | Attribute GUISearchUsers |
|  | Search History element |  |  | ✓ | Attribute of GUIRegularNavigation class |
|  | Search Pipelines |  |  | ✓ | Attribute of GUISpecifyPipeline class |
|  | Search pipelines criteria |  |  | ✓ | Attribute of GUISpecifyPipeline class |
|  | Search services criteria |  |  | ✓ | Attribute of Error class |
|  | Search Services element |  |  | ✓ | Attribute GUIPrivilegedNavigation class |
|  | Search Pipelines element |  |  | ✓ | Attribute GUIPrivilegedNavigation class |
|  | Search Queries element |  |  | ✓ | Attribute GUIPrivilegedNavigation class |
|  | Search Users element |  |  | ✓ | Attribute GUIPrivilegedNavigation class |
|  | Service execution error |  |  | ✓ | Attribute of Error class |
|  | Service Statistics |  |  | ✓ | Attribute of Statistics class |
|  | Service timeout error |  |  | ✓ | Attribute of Error class |
|  | Service Type drop down list |  |  | ✓ | Attribute of GUISpecificError class |
|  | Services used |  |  | ✓ | Attribute of Pipeline class |
|  | Source Format dropdown list |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Source Formats |  |  | ✓ | Attribute of Query class |
|  | Source Type drop down list |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Start Date section |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Status, Status types, status of this service |  |  | ✓ | Attribute of RegularService class |
|  | Status drop down list |  |  | ✓ | Attribute of GUISpecifyService class |
|  | Supported abstraction drop down list |  |  | ✓ | Attribute of GUIEditMapper class |
|  | Suspended, status |  |  | ✓ | Attribute of RegularUser class |
|  | Syntax error |  |  | ✓ | Attribute of Error |
|  | Target Format drop down list |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Target Format drop down list, target formats |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Target Type drop down list |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Target Type drop down list |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Target types |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | The system |  |  | ✓ | The whole system is not a class by itself. |
|  | Toggle button |  |  | ✓ | Attribute of GUISpecifyService class, and GUISearchUsers |
|  | Toolkit drop down list |  |  |  | Attribute of GUIEditTransformer class |
|  | Total number of malformed URI errors |  |  | ✓ | Attribute of Statistics class |
|  | Total number of pipeline input data errors |  |  | ✓ | Attribute of Statistics class |
|  | Total number of pipeline time outs |  |  | ✓ | Attribute of Statistics class |
|  | Total number of query syntax errors |  |  | ✓ | Attribute of Statistics class |
|  | Total number of service execution errors |  |  | ✓ | Attribute of Statistics class |
|  | Total number of service input data errors |  |  | ✓ | Attribute of Statistics class |
|  | Total number of service time outs |  |  | ✓ | Attribute of Statistics class |
|  | Total number of services registered |  |  | ✓ | Attribute of Statistics class |
|  | Total number of zero pipeline results errors |  |  | ✓ | Attribute of Statistics class |
|  | Transformer |  |  | ✓ | Attribute of Service class |
|  | URIs |  |  | ✓ | Attribute of Service class |
|  | URL |  |  | ✓ | Attribute of Service class |
|  | User account |  |  | ✓ | Attribute of Regular User class |
|  | Users’ pipeline execution histories |  |  | ✓ | Attribute of Statistics class |
|  | Values |  |  | ✓ | Attribute of GUIEditMapper class |
|  | View Arguments button |  |  | ✓ | Attribute of GUIViewServiceDetails class |
|  | View Details button |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Viewer Set |  |  | ✓ | Attribute of Query class |
|  | Viewer set dropdown list |  |  | ✓ | Attribute of GUISpecifyPipeline, GUISpecifyServices, GUISpecifyHistory, GUISpecifyQuery classes |
|  | Viewers |  |  | ✓ | Attribute of Query |
|  | Visko module installer script, module |  | ✓ |  | A possible attribute of Service class, still need to review. |
|  | VisKo’s web server |  |  | ✓ | Not relevant to our system. |
|  | Visualization Abstraction |  |  | ✓ | Attribute of Query class |
|  | Visualize element |  |  | ✓ | Attribute of GUIRegularHeading class |
|  | Error message |  |  | ✓ | General Error Message used for all errors [incorrect password, other errors, etc] |
|  | Regular User Page |  |  | ✓ | Broken down into small GUI classes in the system, therefore is not a class. |
|  | Query Statistics |  |  | ✓ | Attribute of Statistics class. |

## Candidate Responsibilities

<< List your candidate responsibilities alphabetically. Use a checkmark to indicate the category of the responsibility (Obvious, Discarded or Unsure). Write down any individual assumptions, constraints or inconsistencies found throughout the process.>>

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Responsibility** | **Verb Phrase** | **Obvious** | **Unsure** | **Discarded** | **Comments** |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

## CRC Cards

<< Write one CRC card per class by assigning responsibilities to appropriate classes based on the work of the previous two subsections.>>

|  |  |
| --- | --- |
| **Class Name:** <<Name of the class>> | |
| **Description:** <<Short description of the class>> | |
| **Responsibilities:**  - <<Responsibility 1>>  - <<Responsibility 2>>  … | **Collaborations:**  << Not used at this time >> |
| **Comments:**  <<Comments if any, e.g., justifications and known attributes>> | |