# Integrative task 2

# Problem identification and requirements analysis

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**Design solution**

## Case Study:

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| Customer | Barney Stinson |
| User | All people interested in knowing information about galaxies, black holes and planets in the observable universe. |
| Context of the problem | In recent years, advances in technology have led to a revolution in astronomy and space exploration. Thanks to increasingly powerful and sophisticated observation instruments. An emblematic example of these technological advances is the capture of the first image of a black hole in April 2019, an achievement indeed.  The image of a black hole, an extremely dense and elusive cosmic entity, became a symbol of what we can achieve when we combine human curiosity with the most advanced technology.  Barney Stinson, aware of the growing fascination and curiosity that space and astronomy awaken in people, seeks to take advantage of these technological advances to bring this excitement to a wider audience. His vision is to create an app that allows people to explore and learn more about the galaxies, black holes, and planets that exist in our observable universe. In essence, he wants this technology that has made it possible to capture images of black holes to also facilitate access to detailed information about these and other astronomical phenomena, thus bringing the cosmos closer to everyone. |
| Functional requirements | 1. Creation of galaxies. 2. Creation of black holes. 3. Creation or registration of planets. 4. Elimination of planets. 5. Modification of planet data. 6. Add photos to planets. 7. View galaxy information. 8. View planet information, including volume and density calculations. 9. Consult the galaxy farthest from Earth. 10. Consult the planet with higher density. 11. Query black holes by type. 12. Consult the telescope with the highest number of photos recorded. 13. Creation of test cases. |
| Non-functional requirements | * Intuitive and user-friendly user interface. * Safety * Yield * Scalability * Usability * Maintenance and Updates * Event Monitoring and Logging * Response Time * The maximum storage capacity over 50 galaxies. * Limits on the number of photos that can be stored for galaxies, black holes, and planets. * The uniqueness of the names of galaxies, black holes and planets. * Efficiency in volume and density calculations. * Storage of URLs of repositories, telescopes and dates for photos. |

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| Identifier and name | *[RF1-Create a Galaxy]* | | | |
| Summary | *This requirement allows users to create a new entry for a galaxy in the application. To do this, they must provide the name of the Galaxy, its distance from Earth (in light years), its shape (Elliptical, Spiral, Lenticular, Irregular), photos of the Galaxy (up to 30 URLs) and data of the associated Black Hole (Name, Mass, Distance to Earth, Type). Galaxy information is stored in the app for future reference.* | | | |
| Tickets | **Entry name** | **Data type** | | **Valid values condition** |
| Name of the Galaxy | String | | *Only text strings are acceptable* |
| Distance to Earth | Positive decimal | | *Decimal numbers greater than 0 are accepted* |
| Shape of the Galaxy | String | | *String is acceptable under the conditions to choose which would be:* Elliptical, Spiral, Lenticular, Irregular |
| Photos of the Galaxy | String List | | String is accepted that in the end would be Urls of the photos |
| Name of the associated black hole | String | | *Only text strings are acceptable* |
| Mass of the associated black hole | Positive decimal | | *Decimal numbers greater than 0 are accepted* |
| Distance to the Earth from the black hole | Positive decimal | | *Decimal numbers greater than 0 are accepted* |
| Type of black hole | String | | *String is accepted under the conditions to choose which would be:* Schwarzschild, Reissner-Nordstrøm, Kerr, Kerr-Newman |
| Result or Postcondition | The data recorded by the user of such Galaxy information will be stored in the application for future reference. | | | |
| Outputs | **Exit name** | | **Data type** | **Format** |
| N/A | | N/A | N/A |

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| Identifier and name | *[RF2- Creating a Black Hole]* | | | |
| Summary | *This requirement allows users to add information about a black hole in the application. They must provide the name of the Black Hole, its mass, distance from Earth (in light years), its type (Schwarzschild, Reissner-Nordstrøm, Kerr, Kerr-Newman) and photos of the Black Hole (up to 5 URLs). The Black Hole information is stored in the app for future reference.* | | | |
| Tickets | **Entry name** | **Data type** | | **Valid values condition** |
| Name of the Black Hole | String | | *Only text strings are acceptable* |
| Black Hole Mass | Positive decimal | | *Decimal numbers greater than 0 are accepted* |
| Distance to Earth | Positive decimal | | *Decimal numbers greater than 0 are accepted* |
| Type of Black Hole | String: Schwarzschild, Reissner-Nordstrøm, Kerr, Kerr-Newman | | *String is accepted under the conditions to choose which would be:* Schwarzschild, Reissner-Nordstrøm, Kerr, Kerr-Newman |
| Photos of the Black Hole | String List | | String is accepted that in the end would be Urls of the photos |
| Result or Postcondition | Black Hole information is stored in the app for future reference | | | |
| Outputs | **Exit name** | | **Data type** | **Format** |
| N/A | | N/A | N/A |

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| Identifier and name | *[RF3- Create or register a Planet]* | | | |
| Summary | *This requirement allows users to create or record information about a planet within an existing galaxy. They must provide the name of the Planet, the number of satellites, photos of the Planet (up to 50 URLs), radius of the Planet, mass of the Planet and the Galaxy to which it belongs. The Planet is added to the Galaxy specified in the database for future reference.* | | | |
| Tickets | **Entry name** | **Data type** | | **Valid values condition** |
| Name of the Planet | String | | *Only text strings are acceptable* |
| Number of Satellites | Positive integer | | *Integers greater than 0 are accepted* |
| Photos of the Planet | String List | | String is accepted that in the end would be Urls of the photos |
| Planet Radio | Positive decimal | | *Decimal numbers greater than 0 are accepted* |
| Mass of the Planet | Positive decimal | | *Decimal numbers greater than 0 are accepted* |
| Galaxy to which the Planet belongs | String | | *Only text strings are acceptable* |
| Result or Postcondition | The Planet is registered in the application and is associated with a Galaxy for future reference. | | | |
| Outputs | **Exit name** | | **Data type** | **Format** |
| N/A | | N/A | N/A |

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| Identifier and name | *[RF4- Remove a Planet]* | | | |
| Summary | *This requirement allows users to remove information from a planet of the application. They must provide the name of the Planet they wish to remove. The Planet information is deleted from the application.* | | | |
| Tickets | **Entry name** | **Data type** | | **Valid values condition** |
| Name of the Planet to delete | String | | *Only text strings are acceptable* |
| Result or Postcondition | The Planet information is removed from the application. | | | |
| Outputs | **Exit name** | | **Data type** | **Format** |
| N/A | | N/A | N/A |

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| Identifier and name | *[RF5- Modify the data of a Planet]* | | | |
| Summary | *This requirement allows users to update information about a planet in the app. They must provide the name of the Planet they wish to modify and new data to update it, which may include name, number of satellites, photos, radio and mass.* | | | |
| Tickets | **Entry name** | **Data type** | | **Valid values condition** |
| Name of the Planet to modify | String | | *Only text strings are acceptable* |
| New name for the planet | String | | *Only text strings are acceptable* |
| Number of Satellites new for the planet | Positive integer | | *Integers greater than 0 are accepted* |
| New photos for the Planet | String List | | String is accepted that in the end would be Urls of the photos |
| New radius of the Planet | Positive decimal | | *Decimal numbers greater than 0 are accepted* |
| Mass of the Planet | Positive decimal | | *Decimal numbers greater than 0 are accepted* |
| Result or Postcondition | Planet data is updated in the app. | | | |
| Outputs | **Exit name** | | **Data type** | **Format** |
| N/A | | N/A | N/A |

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| Identifier and name | *[RF6-Add a Photo to a Planet ]* | | | |
| Summary | *This requirement allows users to add a photo to a planet in the app. They must provide the name of the Planet to which they wish to add the photo, the URL of the Photo, the Telescope that took it, and the date the photo was taken.* | | | |
| Tickets | **Entry name** | **Data type** | | **Valid values condition** |
| Name of the Planet to which the photo is added | String | | *Only text strings are acceptable* |
| Telescope that took the photo | String | | *Only text strings are acceptable* |
| Photo Date | String | | *Date in dd-mm-yyyy format* |
| Photo URL | String | | *Only text strings are acceptable* |
| Result or Postcondition | The photo is added to the Planet specified in the app. | | | |
| Outputs | **Exit name** | | **Data type** | **Format** |
| N/A | | N/A | N/A |

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| Identifier and name | *[RF7- Consult the information of a Galaxy]* | | | |
| Summary | *This requirement allows users to consult the detailed information of an existing Galaxy in the application. It does not require direct user input, as the user selects the Galaxy of interest within the app.* | | | |
| Tickets | **Entry name** | **Data type** | | **Valid values condition** |
| N/A | N/A | | N/A |
| Result or Postcondition | The information of the selected Galaxy is presented to the user. | | | |
| Outputs | **Exit name** | | **Data type** | **Format** |
| Galaxy Information | | String | Text strings per screen |
| Name of the galaxy | | String | Text string per screen |
| distance to Earth from the galaxy | | Positive decimal | Number of the decimal form displayed on the screen |
| Shape of the galaxy | | String | Text string per screen |
| Photos of the galaxy | | String | Text string in the form of a list per screen |
| details of the associated Black Hole | | String | Text string per screen |

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| Identifier and name | *[RF8- Consult the information of a Planet]* | | | |
| Summary | *This requirement allows users to consult the detailed information of an existing Planet in the application. It does not require direct user input, as the user selects the Planet of interest within the app.* | | | |
| Tickets | **Entry name** | **Data type** | | **Valid values condition** |
| N/A | N/A | | N/A |
| Result or Postcondition | The information of the selected Planet is presented to the user. | | | |
| Outputs | **Exit name** | | **Data type** | **Format** |
| Planet Information | | String | Text string per screen |
| Name of the planet | | String | Text string per screen |
| Number of satellites | | Positive integer | Integer displayed per screen |
| Radio | | Positive decimal | Number of the decimal form displayed on the screen |
| Volume | | Positive decimal | Number of the decimal form displayed on the screen |
| Density | | Positive decimal | Decimal number displayed per screen |
| Photos | | String | Text string in the form of a list per screen |
| Mass | | Positive decimal | Decimal number displayed per screen |

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| Identifier and name | *[RF9- Consult the name of the galaxy farthest from planet Earth.]* | | | |
| Summary | *This requirement allows users to consult which Galaxy is farthest from Earth. Thus indicating the most distant Galaxy.* | | | |
| Tickets | **Entry name** | **Data type** | | **Valid values condition** |
| N/A | N/A | | N/A |
| Result or Postcondition | The name of the galaxy farthest from Earth is identified. | | | |
| Outputs | **Exit name** | | **Data type** | **Format** |
| Name of the galaxy farthest from Earth. | | String | N/A |

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| Identifier and name | *[RF10- Consult the name of the planet with the highest density. ]* | | | |
| Summary | *This requirement allows users to consult which is the Planet with the highest density.* | | | |
| Tickets | **Entry name** | **Data type** | | **Valid values condition** |
| N/A | N/A | | N/A |
| Result or Postcondition | The name of the Planet with the highest density is identified. | | | |
| Outputs | **Exit name** | | **Data type** | **Format** |
| Name of the planet with the highest density. | | String | N/A |

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| Identifier and name | *[RF11- Consult the names of black holes according to their type]* | | | |
| Summary | *This requirement allows users to query the names of Black Holes that match a specific type (Schwarzschild, Reissner-Nordstrøm, Kerr, Kerr-Newman). It does not require direct user input, as the user selects the type of Black Hole of interest within the application.* | | | |
| Tickets | **Entry name** | **Data type** | | **Valid values condition** |
| Desired Black Hole Type | String | | *String is accepted under the conditions to choose which would be:* Schwarzschild, Reissner-Nordstrøm, Kerr, Kerr-Newman |
| Result or Postcondition | The names of the Black Holes that match the specified type are presented. | | | |
| Outputs | **Exit name** | | **Data type** | **Format** |
| Names of Black Holes that match the specified type | | String | N/A |
| the name of the Galaxy to which they belong that matches the specified type | | String | N/A |

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| Identifier and name | *[RF12- Name of the telescope with the highest number of photos recorded. ]* | | | |
| Summary | *This requirement allows users to consult which telescope has recorded the highest number of photos. Identifying the name of the telescope with the highest number of photos recorded.* | | | |
| Tickets | **Entry name** | **Data type** | | **Valid values condition** |
| N/A | N/A | | N/A |
| Result or Postcondition | The name of the telescope with the highest number of photos recorded is identified. | | | |
| Outputs | **Exit name** | | **Data type** | **Format** |
| Name of the telescope with the highest number of photos recorded. | | String | A previously registered telescope will be displayed |

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| Identifier and name | *[RF13- ]* | | | |
| Summary | *This requirement allows users to generate test cases to verify the operation of the system.*  *Considering that test cases are created for use in future tests.* | | | |
| Tickets | **Entry name** | **Data type** | | **Valid values condition** |
| N/A | N/A | | N/A |
| Result or Postcondition | Test cases are created for use in future testing. | | | |
| Outputs | **Exit name** | | **Data type** | **Format** |
| N/A | | N/A | N/A |