**Checkpoints - Part 1**

**Checkpoint 1: Data Cleaning 1**

1. Load the companies and rounds data (provided on the previous page) into two data frames and name them**companies**and**rounds2** respectively.
2. Table 1.1: The table below is just for reference — you need to fill out the spreadsheet which is attached in the download section. This holds true for all the tables.

**Results Expected: Table 1.1**

**Table 1.1: Understand the Data Set**

|  |  |
| --- | --- |
| How many **unique companies** are present in **rounds2**? |  |
| How many**unique companies** are present in **companies**? |  |
| In the **companies** data frame, which column can be used as the unique key for each company? Write the **name of the column**. |  |
| Are there any companies in the rounds2 file which are not present in companies? Answer yes or no: **Y/N** |  |
| Merge the two data frames so that all variables (columns) in the **companies**frame are added to the **rounds2** data frame. Name the merged frame **master\_frame***.*How many observations are present in master\_frame? |  |

 After this, you will need to work only with the **master frame.**

**Checkpoint 2: Funding Type Analysis**

This is the first of the three goals of data analysis – investment type analysis.

The funding types such as seed, venture, angel, etc. depend on the type of the company (startup, corporate, etc.), its stage (early stage startup, funded startup, etc.), the amount of funding (a few million USD to a billion USD), and so on. For example, seed, angel and venture are three common stages of startup funding.

* Seed/angel funding refer to early stage startups whereas venture funding occurs after seed or angel stage/s and involves a relatively higher amount of investment.
* Private equity type investments are associated with much larger companies and involve much higher investments than venture type. Startups which have grown in scale may also receive private equity funding. This means that if a company has reached the venture stage, it would have already passed through the angel or seed stage/s.

**Spark Funds wants to choose one of these four investment types for each potential investment they will make.**

Considering the constraints of Spark Funds, you have to decide one funding type which is most suitable for them.

1. Calculate the **most representative value of the investment amount**for each of the four funding types (venture, angel, seed, and private equity) and report the answers in **Table 2.1**
2. Based on the most representative investment amount calculated above, which investment type do you think is the most suitable for Spark Funds?

Considering that Spark Funds wants to invest between **5 to 15 million USD** per investment round, which investment type is the most suitable for it? Identify the investment type and, for further analysis, filter the data so it only contains the chosen investment type.

Great! You have crossed two checkpoints. There are four checkpoints left now.

**Checkpoints - Part 2**

**Checkpoint 3: Country Analysis**

This is the second goal of analysis — **country analysis**.

Now that you know the type of investment suited for Spark Funds, let's narrow down the countries.

Spark Funds wants to invest in countries with the highest amount of funding for the chosen investment type. This is a part of its broader strategy to invest where **most investments are occurring**.

1. Spark Funds wants to see the top nine countries which have received the highest total funding (across ALL sectors for the chosen investment type)
2. For the chosen investment type, make a data frame named **top9** with the top nine countries (based on the total investment amount each country has received)

**Identify the top three English-speaking countries in the data frame top9.**

**Results Expected:**All codes for data frame top9. Fill out Table 3.1.

Table 3.1:Analysing the Top 3 English-Speaking Countries

|  |  |
| --- | --- |
| 1. Top English-speaking country |  |
| 2. Second English-speaking country |  |
| 3. Third English-speaking country |  |

Now you also know the three most investment-friendly countries and the most suited funding type for Spark Funds. Let us now focus on finding the best sectors in these countries.

**Checkpoint 4: Sector Analysis 1**

This is the third goal of analysis**— sector analysis.**

When we say sector analysis, we refer to one of the **eight main sectors**(named **main\_sector**) listed in the mapping file (note that ‘Other’ is one of the eight main sectors). This is to simplify the analysis by grouping the numerous category lists (named ‘category\_list’) in the mapping file. For example, in the mapping file, category\_lists such as ‘3D’, ‘3D Printing’, ‘3D Technology’, etc. are mapped to the main sector ‘Manufacturing’.

Also, for some companies, the category list is a list of multiple sub-sectors separated by a pipe (vertical bar |). For example, one of the companies’ category\_list is Application Platforms|Real Time|Social Network Media.

You discuss with the CEO and come up with the **business rule** that the first string before the vertical bar will be considered the **primary sector**. In the example above, ‘Application Platforms’ will be considered the primary sector.

1. **Extract**the primary sector of each category list from the **category\_list column**
2. Use the **mapping file** 'mapping.csv' to map each primary sector to one of the eight main sectors (Note that ‘Others’ is also considered one of the main sectors)

**Expected Results:**Code for a merged data frame with each primary sector mapped to its main sector (the primary sector should be present in a separate column).

**Checkpoint 5: Sector Analysis 2**

Now you have a data frame with each company’s main sector (main\_sector) mapped to it. When we say sector analysis, we refer to one of the eight main sectors.

Also, you know the top three English speaking countries and the most suitable funding type for Spark Funds. Let’s call the three countries 'Country 1', 'Country 2' and 'Country 3' and the funding type 'FT'.

Also, the range of funding preferred by Spark Funds is **5 to 15 million USD**.

Now, the aim is to find out the most heavily invested main sectors in each of the three countries (for funding type FT and investments range of 5-15 M USD).

1. Create three separate data frames D1, D2 and D3 for each of the three countries containing the observations of funding type FT falling within the 5-15 million USD range. The three data frames should contain:

* All the columns of the master\_frame along with the primary sector and the main sector
* The total number (or count) of investments for each main sector in a separate column
* The total amount invested in each main sector in a separate column

Using the three data frames, you can calculate the total number and amount of investments in each main sector.

**Result Expected**

1. Three data frames **D1, D2**and**D3**
2. Table 5.1: Based on the analysis of the sectors, which main sectors and countries would you recommend Spark Funds to invest in? Present your conclusions in the presentation. The conclusions are subjective (i.e. there may be no ‘one right answer’), but it should be based on the basic strategy — invest in sectors where most investments are occurring.

**Note: In the following table, all the observations refer to investments of the type FT within 5-15 M USD range.**

Table 5.1 : Sector-wise Investment Analysis

|  | **Country 1** | **Country 2** | **Country 3** |
| --- | --- | --- | --- |
| 1. Total number of investments (count) |  |  |  |
| 2. Total amount of investment (USD) |  |  |  |
| 3. Top sector (based on count of investments) |  |  |  |
| 4. Second-best sector (based on count of investments) |  |  |  |
| 5. Third-best sector (based on count of investments) |  |  |  |
| 6. Number of investments in the top sector (refer to point 3) |  |  |  |
| 7. Number of investments in the second-best sector (refer to point 4) |  |  |  |
| 8. Number of investments in the third-best sector (refer to point 5) |  |  |  |
| 9. For the top sector count-wise (point 3), which company received the highest investment? |  |  |  |
| 10. For the second-best sector count-wise (point 4), which company received the highest investment? |  |  |  |

**Checkpoint 6: Plots**

As a final step, you have to present your findings to the CEO of Spark Funds. Specifically, she wants to see the following plots:

1. A plot showing the fraction of total investments (globally) in venture, seed, and private equity, and the average amount of investment in each funding type. This chart should make it clear that a certain funding type (FT) is best suited for Spark Funds.
2. A plot showing the top 9 countries against the total amount of investments of funding type FT. This should make the top 3 countries (Country 1, Country 2, and Country 3) very clear.
3. A plot showing the number of investments in the **top 3 sectors** of the **top 3 countries**on one chart (for the chosen investment type FT).

 This plot should clearly display the top 3 sectors each in Country 1, Country 2, and Country 3.

**Expected Result:** The three plots.