**Lab Report of Probability and Statistics on SPSS**

Submitted to

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| Lab Title: Graphs and Charts | | | | | |
| Signature of Instructor: | | | | | |

**Objectives:**

1. To create high resolution charts and graphs:
2. Simple bar,
3. Cluster bar,
4. Pie-chart,
5. Histogram,
6. Box plot
7. To make elegance: Binning, Labeling, inserting data (number or %)
8. For report or presentation: Exporting images (.jpg, .png, .eps, etc.)

**Procedure for objective 1(a)**:

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| **Step 1:** In the Data view of SPSS software, the “Graphs” menu is selected from the top-most options, followed by choosing the “Legacy Dialogs” option. This opens a menu with various chart types, where the "Bar" chart is selected, as outlined in the first objective. |  |
| **Step 2:** After selecting "Bar," a menu appears for choosing the type of bar chart. In this case, the "Simple" option is selected to create a simple bar chart. |  |
| **Step 3:** In this menu, the user is provided with options for the “Category Axis” and how the bars should be represented. According to the requirements, “Gender” is selected for the Category Axis, and “N of cases” is chosen to represent the bars. |  |
| **Step 4:** The output page then displays the created simple bar graph, where the representation of the variables can be adjusted by double-clicking on the bar. In this case, the fill and border of the bar are modified to enhance the visual representation. |  |

**Output of objective 1(a):**

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| After applying the necessary changes in the output, the system generates the simple bar chart as shown in the figure. In this chart, the bar representing the male population is filled with slanted lines, while the bar for the female population is filled with points, visually distinguishing the two categories. |  |

**Procedure for objective 1(b):**

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| **Step 1:** Similar to step 1 of objective 1(a), the “Bar” option is selected from the top-most menu options. Then, from the available types of bar charts, the "Clustered" bar chart is chosen. |  |
| **Step 2:** To create the clustered bar chart, the options for the Category Axis, Clusters definition, and Bars representation are selected. In this case, "Provinces" is chosen for the Category Axis, "Gender" is selected for defining the clusters, and "N of cases" is chosen to represent the bars. |  |
| **Step 3:**The output page generates the clustered bar graph for the variables "provinces" and "gender." By double-clicking on the created bar, a menu opens where adjustments can be made to enhance the representation of the image. |  |

**Output of objective 1(b):**

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| The image shows the clustered bar chart created using SPSS software, where the count of male and female individuals from each province is represented. The male population is depicted using points, while the female population is represented with slanted lines. |  |

**Procedure for objective 1(c):**

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| **Step 1:** Following the previous objectives, the Graphs menu is opened, and the Pie option is selected from the Legacy Dialogs menu. The variables are defined by selecting "Provinces" for the slice definition and "Gender" for the rows of the pie chart. |  |
| **Step 2:** Once the pie chart is created,  the required adjustments are made to clearly represent the variables. Each variable is shown with a unique pattern or color. To ensure proper differentiation, the system prevents changes to the pattern until a specific segment is selected for modification. |  |

**Output of objective 1(c):**

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| The image shows the pie-chart where the specific parts of the chart are differentiated by specific pattern. Here, the male and female population of each province of Nepal is shown by the created pie-chart. |  |

**Procedure for objective 1(d)**:

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| **Step 1:**Similar to the initial steps of the previous objectives, the "Histogram" option is selected from the Graphs – Legacy Dialogs menu. Next, the variable for creating the histogram is chosen. In this case, “Income” is selected as the variable for the histogram. |  |
| **Step 2:**Similar to other charts and graphs, modifications to the histogram can also be made by double-clicking on the created graph. This opens a menu that allows users to adjust the patterns and colors of the graph, as well as change the binning of the histogram. |  |

**Output of objective 1(d):**

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| The output page gives the presented image upon changing the required aspects of the software created histogram. |  |

**Procedure for objective 1(e)**:

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| **Step 1:** Following similar steps as in the previous objectives, with the only difference being that “Boxplot” is selected from the Legacy Dialogs menu, the option to choose between a simple or clustered boxplot is presented. Here, the simple boxplot is selected. The displayed image shows the resulting page, where “SEE” is chosen as the variable and “Gender” as the Category Axis. |  |
| **Step 2:** Double-clicking on the created boxplot opens a menu that allows modifications to be made to the chart, where the necessary changes can be applied. |  |

**Output of objective 1(e):**

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| By following the above steps for the specified objective, the resulting image displays a boxplot for the variable “SEE,” with the values categorized by the variable “Gender.” |  |

**Conclusion for objective 1:**

The objective for the creation of the different types of the graphs and charts is completed by following the above steps. The sub-objectives consisting- bar, pie-chart, histogram, boxplot are completed by following through the steps mentioned where the SPSS software creates the required type of the charts and graph in its separate output screen.

**Procedure for objective 2**:

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| **Step 1:** After creating the histogram, double-clicking on it opens a menu that allows modifications to the graph. Among the available options, selecting “Binning” reveals the settings shown in the image. In the X-axis category, the custom option is chosen, enabling the user to specify the “Number of Intervals.” Selecting 8 divides the values into 8 distinct categories. |  |
| **Step 2:** To label each range in the histogram, changes can be made in the “Data Value Labels” menu. This menu enables you to adjust the position and display of the labels based  on your preferences. |  |

**Output of objective 2:**

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| Labeling and binning are essential for creating clearer and more interpretable histograms. The attached image shows a histogram of income, divided into eight distinct ranges based on the values. |  |

**Conclusion for objective 2:**

The 2nd objective helps in maintaining elegance in the graphs and charts created using the SPSS software. Here, following the above steps helped to create a easily understandable histogram with its appropriate labeling and binning of the variable that is used in the graph.

**Procedure for objective 3**:

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| **Step 1:** In the output page of SPSS software, the "File" option is selected, opening a menu with various options. From these, the "Export" option is chosen to export all the charts and graphs created using the software. |  |
| **Step 2:** After the first step, a window like the one shown in the image opens, allowing the user to choose the file format for exporting the files. The user then selects the desired location for saving the file and clicks "OK" to finalize the process. |  |

**Output of objective 3:**

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| The images are then exported to the location specified by the user in the format selected by the user. |  |

**Conclusion for objective 3:**

The charts and graphs created using the SPSS software are exported locally into the location specified by the user in the user selected format for the future use. The best file format for exporting of the images is “.eps” which is of the highest resolution but “.jpg” comes as the second best which takes less storage space than “.eps”. Therefore, “.jpg” format is chosen for the smaller project however, “.eps” format is chosen for the higher project.