Assignment Solution

1. Assignment

The **Body Adiposity Index** (BAI) is a method of estimating the amount of **body** fat in humans. The BAI is calculated without using **body** weight, unlike the **body mass index** (BMI). Instead, it uses the size of the hips compared to the person's height.

Body adiposity index classification ranges for men and women, as outlined by Gallagher et al., are shown in the table below.

Body Adiposity Index Classifications for Women				
Age (years)	Underweight	Healthy	Overweight	Obese
20 - 39	Less than 21%	21% to 33%	Greater than 33%	Greater than 39%
40 - 59	Less than 23%	23% to 35%	Greater than 35%	Greater than 41%
60 - 79	Less than 25%	25% to 38%	Greater than 38%	Greater than 43%
Body Adiposity Index Classifications for Men				
Age (years)	Underweight	Healthy	Overweight	Obese
20 - 39	Less than 8%	8% to 21%	Greater than 21%	Greater than 26%
40 - 59	Less than 11%	11% to 23%	Greater than 23%	Greater than 29%
60 - 79	Less than 13%	13% to 25%	Greater than 25%	Greater than 31%

The following equation is used to calculate the body adiposity index:
$BAI = (HC / (HM)^{1.5}) - 18$

Where:
BAI = Body Adiposity Index
HM = Height in Metres
HC = Hip Circumference in Centimetres

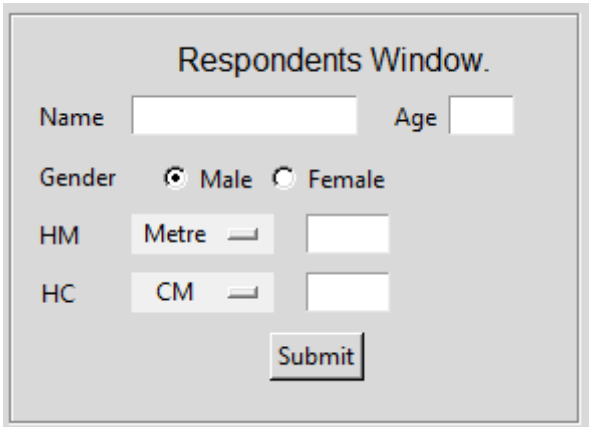
Colombo O, Villani S, Pinelli G, Trentani C, Baldi M, Tomarchio O, Tagliabue A. To treat or not to treat: comparison of different criteria used to determine whether weight loss is to be recommended. Nutr J. 2008 Jan 29;7:5.
Gallagher D, Heymsfield SB, Heo M, Jebb SA, Murgatroyd PR, Sakamoto Y. Healthy percentage body fat ranges: an approach for developing guidelines based on body mass index. Am J Clin Nutr. 2000 Sep;72(3):694-701.

2. Decomposition, Planning and Design

Project is decomposed following sub-parts:

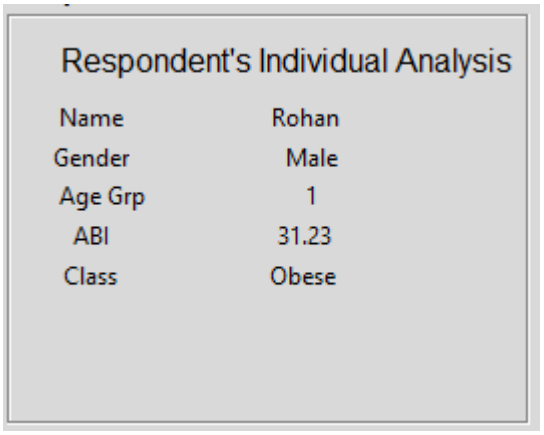
1. Respondents Window

This window provides facility to give inputs to the application of a respondent. This window contains entry section for Name, Gender, Age, HM and HC in different linear scales.



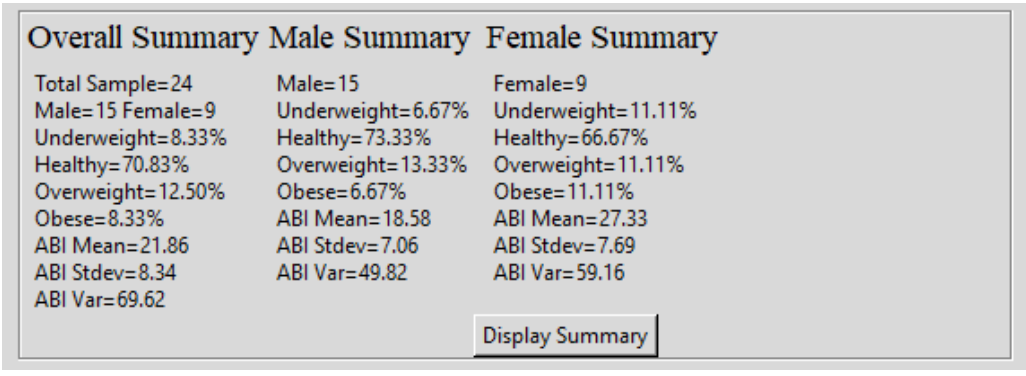
2. Individual Respondents Analysis

This window will display processed data of individual at the time of input. There are three age group, 1 for 20-39, 2 for 40-59 and 3 for 60-79. After submitting the data of Rohan , output are shown.



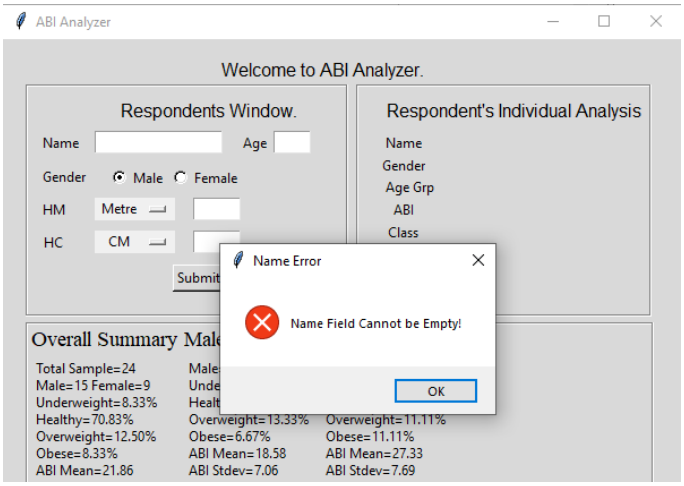
3. Over Summary Window

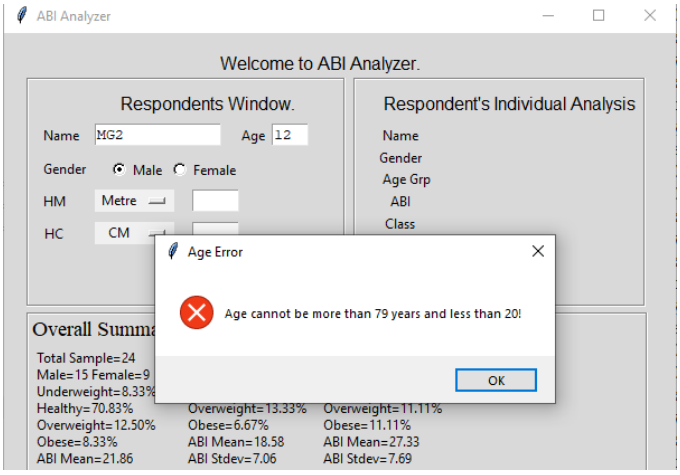
This section contains the analysis of the stored data. Any time “Display Summary” button is clicked, statistics of the latest updated data will be displayed. It contain three part, 1- Overall Summary of data, 2-Male Respondents Summary, and 3-Female Respondents Summary.

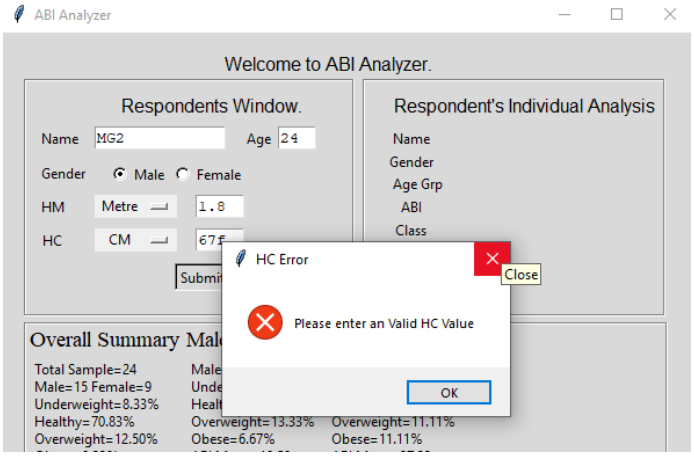


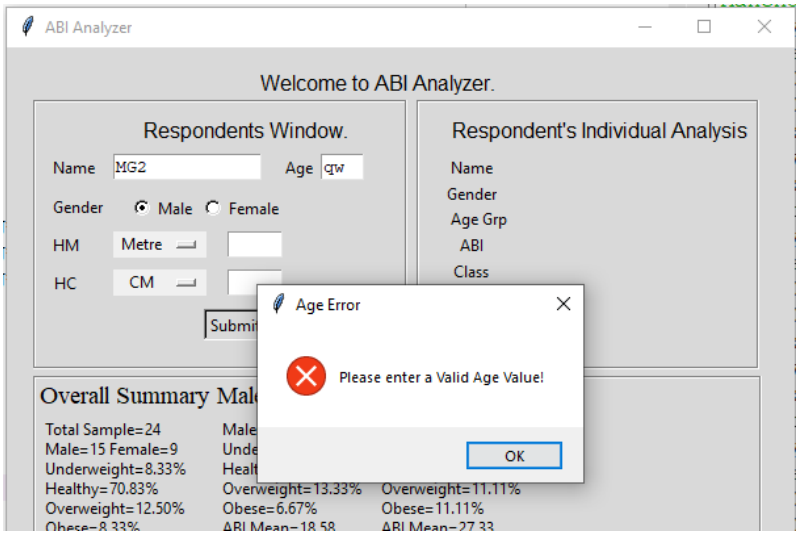
4. Input Validation

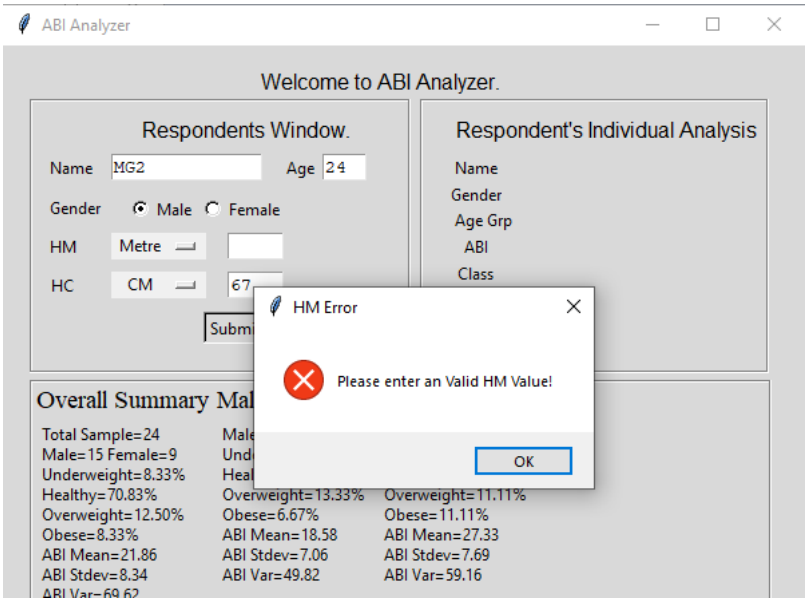
This section validates each entry and data which is to be submitted. Data is submitted only when all data entries are valid. For each invalid entries alert message are shown.







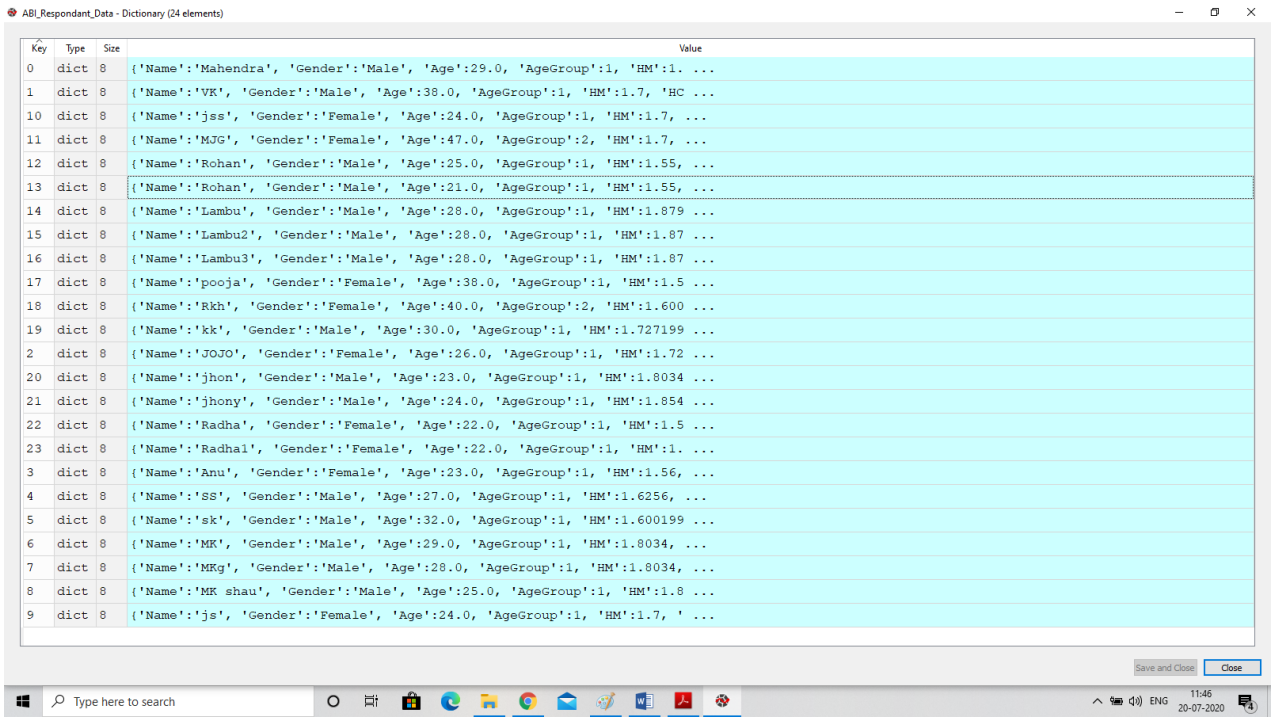

ABI Analyzer
Welcome to ABI Analyzer.
Respondents Window.
Name MG2
Age qw
Gender Male Female
HM Metre
HC CM
Submit
Respondent's Individual Analysis
Name
Gender
Age Grp
ABI
Class
Age Error
Please enter a Valid Age Value!
OK
Overall Summary Mal
Total Sample=24
Male=15 Female=9
Underweight=8.33%
Healthy=70.83%
Overweight=12.50%
Overweight=13.33%
Obese=6.67%
Overweight=11.11%
Obese=11.11%


ABI Analyzer
Welcome to ABI Analyzer.
Respondents Window.
Name MG2
Age 24
Gender Male Female
HM Metre
HC CM
67
Respondent's Individual Analysis
Name
Gender
Age Grp
ABI
Class
HM Error
Please enter an Valid HM Value!
OK
Overall Summary Mal
Total Sample=24
Male=15 Female=9
Underweight=8.33%
Healthy=70.83%
Overweight=12.50%
Obese=8.33%
ABI Mean=21.86
ABI Stdev=8.34
Overweight=13.33%
Obese=6.67%
ABI Mean=18.58
ABI Stdev=7.06
ABI Var=49.82
Overweight=11.11%
Obese=11.11%
ABI Mean=27.33
ABI Stdev=7.69
ABI Var=59.16

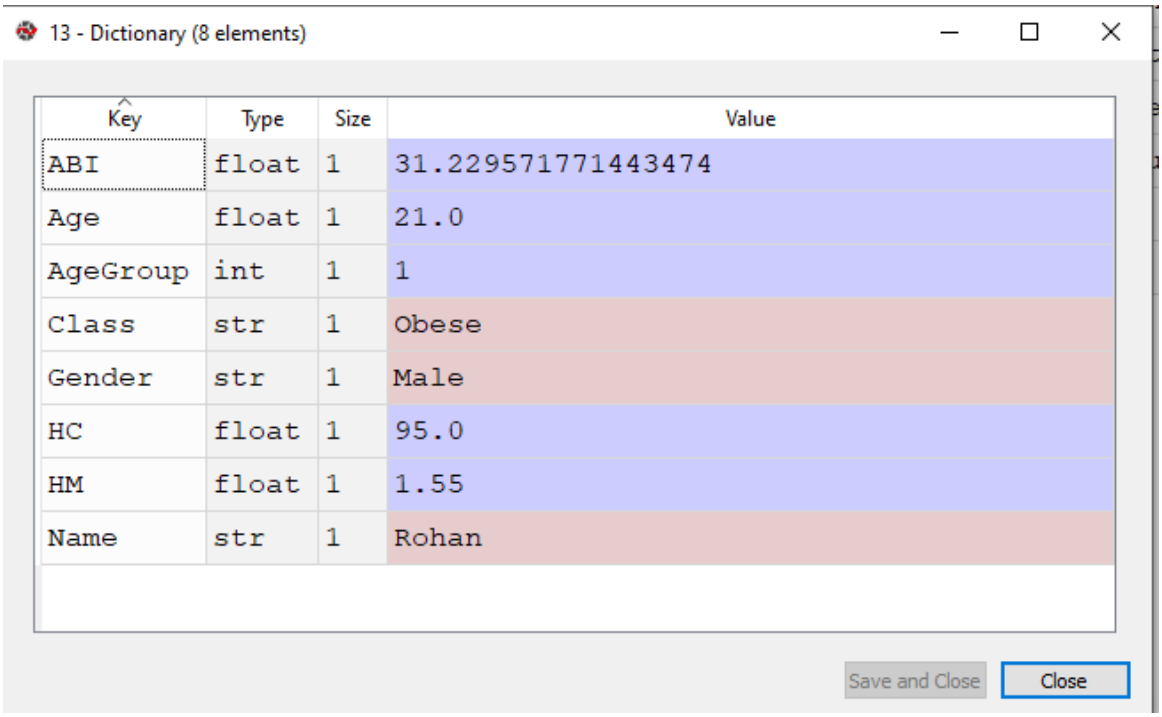
5. Data Storage and Updation

Every time respondent submit individual data it is stored in runtime environment and when window is going close, before that all the data gets updated in *"ABI_Respondant_Data.json"* file which is stored in same directory.

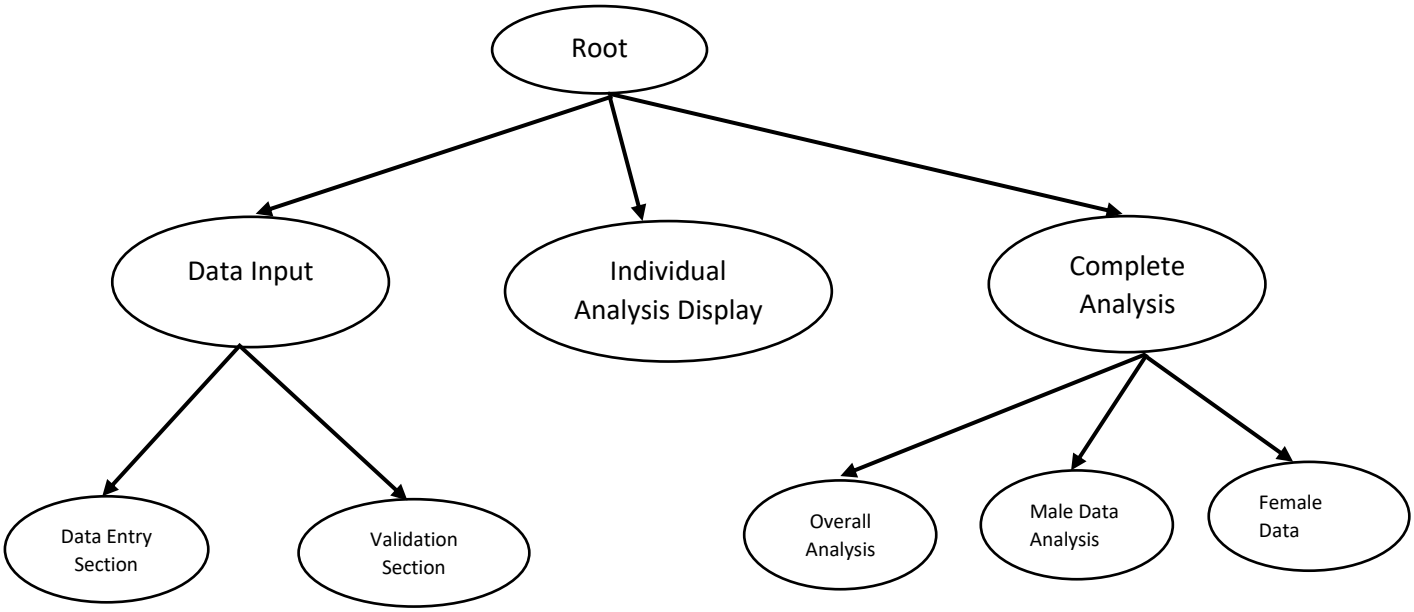
Complete Data



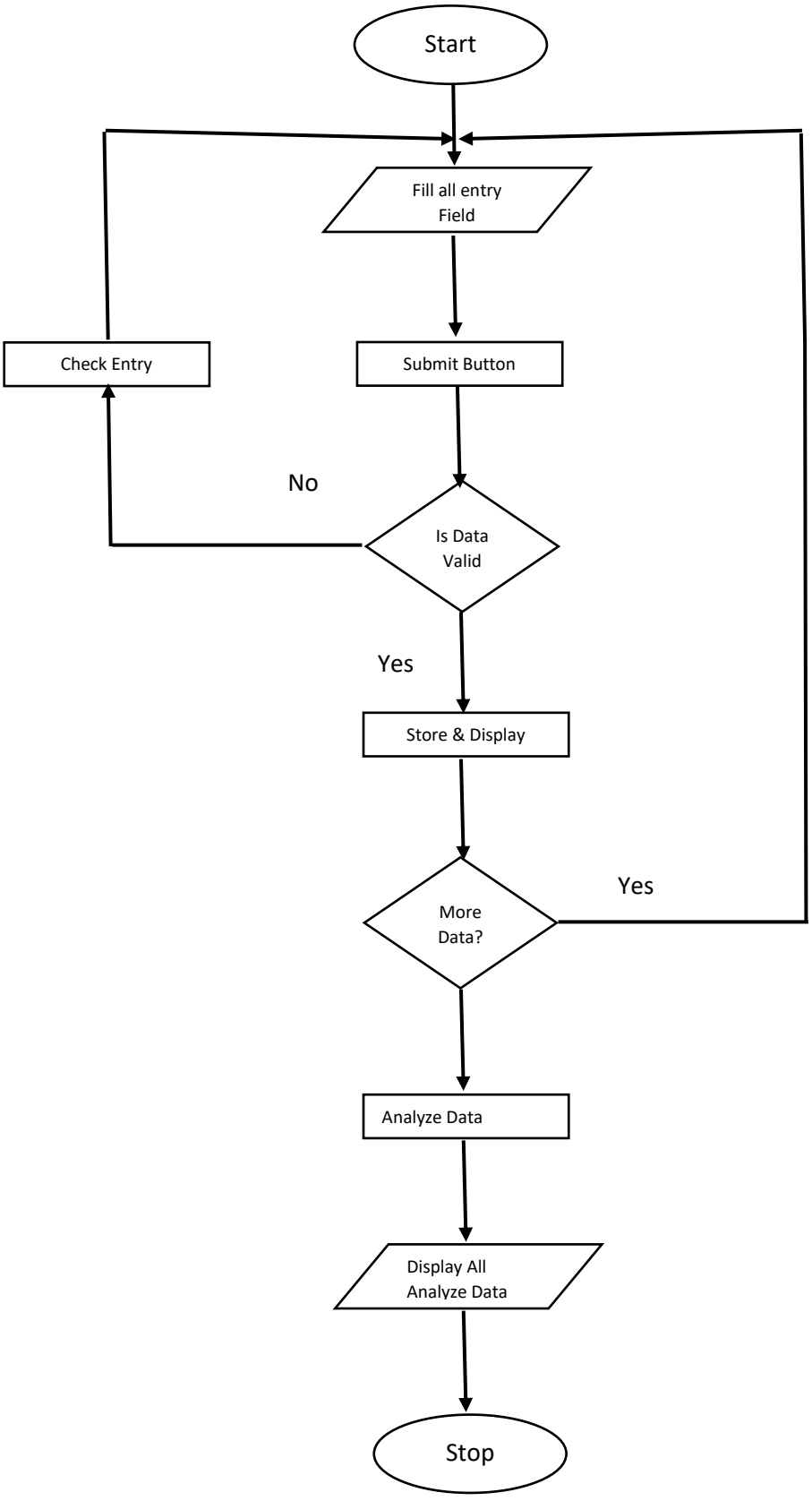
Individual Data



6. Error Checking
7. Hierarchical Structure of Project.



1. Flowchart


Start
Fill all entry Field
Submit Button
Check Entry
No
Is Data Valid
Yes
Store & Display
More Data?
Yes
Analyze Data
Display All Analyze Data
Stop

3. Implementation
4. Testing and Analysis
5. Review
6. Demonstration

Test Sample

Mahendra Gupta Age=39 HM=1.803 HC=93.96

Jyoti Gupta Age=26 HM=1.72 HC=99.08