Seneca

Academic Year	2023 – 2024		
Semester	☒ Fall	☐ Winter	☐ Summer
Course Code - Name	BAN130		
Instructor	Zeynep Cevik, PhD		
Assessment	Projects		
Due Date	Tuesday, November 28, 2023		

Student ID	Student Name	Role
113265227	Prashant Rokka	Group Lead
143802221	Ankit Yadav	Member
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Projects

You are required to choose a project from the list of the projects specified in this document and complete it within groups of max. 4. The project is expected to test your technical skills in SAS base programming and soft skills.

Since, this is a group project, it is required to be done in groups of maximum 4. In exceptional cases, there can be 1 member in a group. Each group should have a Group Lead who would be responsible for submitting the project on Blackboard (Please note that not all the members of the group are required to submit the project separately on Blackboard. One submission from the Group Lead would be sufficient). It is also the responsibility of the Group Lead to inform the instructor about the Group members and the project they have chosen by **November 6th, 2023 (please send instructor an email about the details)**. In case an email is not received, instructor would assign the groups, group leads and the project on **November 7th, 2023.**

The detailed requirements for each project are available in this document, so please go through the details and fulfil all the requirements to avoid missing any marks.

Finally, follow the below mentioned instructions carefully.

Instructions:

In order to obtain maximum marks in this assessment, please ensure the followings:

- Don't forget to write your name and ID on the first page of this document. The student IDs and names of all the students in the group should be mentioned along with the roles.
- Submit the project by writing your solution in this document under the Solution heading below. Do not use a separate document. Everything related to the project should be included in this document, e.g., code, screenshots and etc.
- This project has a weightage of **30%** marks of the course.
- This is a group project so **only 1 submission from the group lead is required.**
- Group Leads are required to submit the project on Blackboard as instructed. Submissions through emails will not be accepted.
- The project deadline is **November 28, 2022**. Submissions after the deadline will not be accepted.

Rubric:

Your assessment will be graded based on the following rubric:

	Excellent (7 - 10)	Average (4 – 6.9)	Poor (<4)
Project Completion and Code (10)	The project was completed without any errors and output is as expected. Fulfills all/most of the requirements for the project.	The project was completed with few errors. Fulfills some of the requirements for the project.	The project is incomplete. Does not fulfill all/most of the requirements.
Detailed Explanation (10)	The student has a good contribution to the project. Knows ins and outs of the project. The student has written his/her part of the project very well. Knows everything / most of his/her part.	The student has average contribution to the project. Does not know the whole project. The student has averagely written his/her part of the project. Knows few of the things about his/her part.	The student has no contribution to the project. Does not know anything / most about the project. The student has poorly wrote the project. Does not know much about the project.
Report (10)	Student has contributed well in preparing the project report and knows all the aspects of the report.	Student has contributed partially in preparing the project report and knows some aspects of the report.	Student has not contributed in preparing the report.

Project 1

Project Name: Adventure Works Product Sales Analysis
Max. no. of students in a group: 4 students

Dataset: AdventureWorks.xlsx (Available on Blackboard)

Requirements:
Below are bare minimum requirements for this project, however, you are free to add more features to your project:

1. Data Import
   - This phase requires you to import the data from the provided excel file into SAS using Proc Import.
     - Product sheet in excel file should be imported as Product dataset in SAS.
     - SalesOrderDetail sheet in excel file should be imported as SalesOrderDetail dataset in SAS.
2. Data Cleaning
   - This phase requires you to clean your data before data analysis phase.
     - Product_Clean:
       - Create a Product_Clean dataset from Product dataset by bringing in only ProductID, Name, ProductNumber, Color and ListPrice
       - All the missing values in Color column should be replaced by 'NA'
       - ListPrice column should be numeric (final column name should be ListPrice) and format should have a dollar sign with 2 decimal places
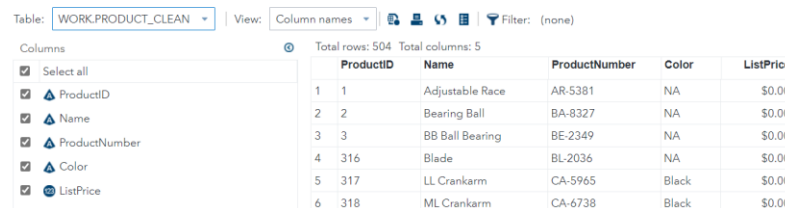   - No un-necessary columns should be part of the Product_Clean dataset. Please see below expected output.

     - SalesOrderDetail_Clean:
       - Create SalesOrderDetail_Clean dataset from SalesOrderDetail dataset by bringing in only SalesOrderID SalesOrderDetailID OrderQty ProductID UnitPrice LineTotal and ModifiedDate
       - ModifiedDate should be numeric with column name ModifiedDate

- UnitPrice should be numeric with column name UnitPrice
- LineTotal should be numeric with column name LineTotal
- OrderQty should be numeric with column name OrderQty
- Include date for year 2013 and 2014 in ModifiedDate only
- ModifiedDate should be mmddyy10. Format
- UnitPrice and LineTotal should have a dollar with 2 decimal places
- No un-necessary columns should be part of the SalesOrderDetail_Clean dataset. Please see expected output below:

3. Joining and Merging
   - This phase requires you to join / merge your datasets to create a dataset for analysis.
     - SalesDetails:
       - Create a SalesDetails dataset by joining SalesOrderDetail_Clean and Product_Clean datasets
       - Use ProductID column for joining the tables
       - SalesDetails table should contain all the observations from SalesOrderDetail_Clean table along with columns from Product_Clean
       - Drop SalesOrderID SalesOrderDetailID ProductNumber and ListPrice from the result dataset. Please see expected output below:

     - SalesAnalysis:
       - Create a SalesAnalysis dataset from SalesDetails dataset that groups all the products by ProductID (hint: research on obtaining a total for each by group in SAS)
       - Create SubTotal and SubOrderQty columns in SalesAnalysis that provides an aggregate sum and quantity of each product by its ProductID.

- SubTotal column should have a dollar and 2 decimal places.
- Please see below expected output:

4. Data Analysis
   - This phase requires you to analyze the SalesAnalysis for Adventure Works and answer the following 5 questions by generating reports using Proc Print for each of the 5 questions:
     - How many Red color Helmets are sold in 2013 and 2014?
     - How many items sold in 2013 and 2014 have a Multi color?
     - What is the combined Sales total for all the helmets sold in 2013 and 2014?
     - How many Yellow Color Touring-1000 where sold in 2013 and 2014?
     - What was the total sales in 2013 and 2014?
   - Create at least one chart in SAS for any analysis of your choice from SalesAnalysis dataset (this analysis can be of your choice and not necessarily from above 5 questions.)
5. Project Report
   - This phase requires you to create a report in MS Word with the following requirements (you can convert to pdf format if the file size is too big):
     - Explain each and every phase of the project (from Phase 1 to 4) along with the screenshots of the output and the related SAS code
     - Include answers to questions in Phase 4 in your report along with the chart you have chosen to create along with its justification
     - Make sure not to miss any phase and output of its screenshot

Project 2

Project Name: Adventure Works Territory Sales Analysis
Max. no. of students in a group: 4 students

Dataset: AdventureWorks.xlsx (Available on Blackboard)

Requirements:
Below are bare minimum requirements for this project, however, you are free to add more features to your project:

1. Data Import
   - This phase requires you to import the data from the provided excel file into SAS using Proc Import.
      - SalesTerritory sheet in excel file should be imported as SalesTerritory dataset in SAS.
      - SalesOrderHeader sheet in excel file should be imported as SalesOrderHeader dataset in SAS.
2. Data Cleaning
   - This phase requires you to clean your data before data analysis phase.
      - SalesOrderHeader_Clean:
         - Create a SalesOrderHeader_Clean dataset from SalesOrderHeader dataset by bringing in only SalesOrderID OrderDate OnlineOrderFlag TerritoryID TotalDue
         - TotalDue column should be numeric (final column name should be TotalDue) and format should have a dollar sign with 2 decimal places
         - OnlineOrderFlag column should be numeric (final column name should be OnlineOrderFlag)
         - OrderDate column should be numeric (final column name should be OrderDate) and format should be mmddyy10.
         - TerritoryID column should be numeric (final column name should be TerritoryID)
         - No un-necessary columns should be part of the SalesOrderHeader_Clean dataset. Please see below expected output.

	SalesOrderID	TotalDue	OnlineOrderFlag	OrderDate	TerritoryID
1	43664	$27,510.40	0	05/31/2011	1
2	43665	$16,158.60	0	05/31/2011	1
3	43669	$807.26	0	05/31/2011	1
4	43671	$9,153.60	0	05/31/2011	1
5	43683	$48,204.00	0	05/31/2011	1
6	43686	$3,899.67	0	05/31/2011	1

Table: WORK.SALESORDERHEADER_CLEAN | View: Column names | Filter: (none)
Total rows: 31465 Total columns: 5

Columns: Select all, SalesOrderID, TotalDue, OnlineOrderFlag, OrderDate, TerritoryID

- Territory_Clean:
    - Create Territory_Clean dataset from SalesTerritory dataset by bringing in only TerritoryID Name CountryRegionCode Group SalesYTD
    - SalesYTD column should be numeric (final column name should be SalesYTD) and format should have a dollar sign with 2 decimal places
    - TerritoryID column should be numeric (final column name should be TerritoryID)
    - No un-necessary columns should be part of the Territory_Clean dataset. Please see below expected output.

	Name	CountryRegionCode	Group	SalesYTD	TerritoryID
1	Northwest	US	North America	$7,887,186.79	1
2	Northeast	US	North America	$2,402,176.85	2
3	Central	US	North America	$3,072,175.12	3
4	Southwest	US	North America	$10,510,853.87	4
5	Southeast	US	North America	$2,538,667.25	5
6	Canada	CA	North America	$6,771,829.14	6

3. Joining and Merging
   - This phase requires you to join / merge your datasets to create a dataset for analysis.
       - SalesDetails:
           - Create a SalesDetails dataset by joining SalesOrderHeader_Clean and Territory_Clean datasets
           - Use TerritoryID column for joining the tables
           - SalesDetails table should contain all the observations from SalesOrderHeader_Clean table along with columns from Territory_Clean
           - Please see expected output below:

	SalesOrderID	TotalDue	OnlineOrderFlag	OrderDate	TerritoryID	Name	CountryRegionCode	Group	SalesYTD
1	73238	$1,276.80	-1	05/18/2014	9	Australia	AU	Pacific	$5,977,814.92
2	70823	$76.21	-1	04/17/2014	9	Australia	AU	Pacific	$5,977,814.92
3	65877	$1,342.40	-1	02/06/2014	9	Australia	AU	Pacific	$5,977,814.92
4	67004	$2,582.68	-1	02/24/2014	9	Australia	AU	Pacific	$5,977,814.92
5	69571	$44.18	-1	03/31/2014	9	Australia	AU	Pacific	$5,977,814.92
6	64658	$1,972.38	-1	01/20/2014	9	Australia	AU	Pacific	$5,977,814.92
7	72101	$1,297.80	-1	05/03/2014	9	Australia	AU	Pacific	$5,977,814.92
8	62292	$54.11	-1	12/17/2013	9	Australia	AU	Pacific	$5,977,814.92
9	74418	$26.28	-1	06/08/2014	9	Australia	AU	Pacific	$5,977,814.92
10	60768	$30.14	-1	11/24/2013	9	Australia	AU	Pacific	$5,977,814.92
11	67685	$2,588.92	-1	03/05/2014	9	Australia	AU	Pacific	$5,977,814.92

- SalesAnalysis:
    - Create a SalesAnalysis dataset from SalesDetails dataset that groups all the Territories by TerritoryID (hint: research on obtaining a total for each by group in SAS)

- Create SubTotal and SubQty columns in SalesAnalysis that provides an aggregate sum and quantity of each Territory by its TerritoryID.
- SubTotal column should have a dollar and 2 decimal places.
- Drop TotalDue, TerritoryID SalesOrderID and OnlineOrderFlag
- Please see below expected output:

	Name	CountryRegionCode	Group	SalesYTD	SubTotalDue
1	Northwest	US	North America	$7,887,186.79	$18,061,631.97
2	Northeast	US	North America	$2,402,176.85	$7,820,197.92
3	Central	US	North America	$3,072,175.12	$8,913,285.31
4	Southwest	US	North America	$10,510,853.87	$27,150,546.52
5	Southeast	US	North America	$2,538,667.25	$8,884,083.76
6	Canada	CA	North America	$6,771,829.14	$18,398,897.29
7	France	FR	Europe	$4,772,398.31	$8,119,733.27
8	Germany	DE	Europe	$3,805,202.35	$5,479,809.95
9	Australia	AU	Pacific	$5,977,814.92	$11,814,353.41
10	United Kingdom	GB	Europe	$5,012,905.37	$8,574,034.66

4. Data Analysis
   - This phase requires you to analyze the SalesAnalysis for Adventure Works and answer the following 5 questions by generating reports using Proc steps for each of the 5 questions:
     - What is the Total Due for all the North American Regions?
     - What is the total Sales YTD for U.S.?
     - How much is due from France and Germany?
     - What is the total Sales YTD for Europe?
     - How many total territories in U.S?
   - Create at least one chart in SAS for any analysis of your choice from SalesAnalysis dataset (this analysis can be of your choice and not necessarily from above 5 questions.)
5. Project Report
   - This phase requires you to create a report in MS Word with the following requirements (you can convert to pdf format if the file size is too big):
     - Explain each and every phase of the project (from Phase 1 to 4) along with the screenshots of the output and the related SAS code
     - Include answers to questions in Phase 4 in your report along with the chart you have chosen to create along with its justification
     - Make sure not to miss any phase and output of its screenshot

For this first phase of this project, we imported the above dataset "AdventureWorks" which is an excel file, into SAS using proc import.

Below is the SAS code we used.

1. **Data Import**:

The code uses the PROC IMPORT procedure in SAS to read data from the specified Excel file and create datasets with the specified names. The "replace" option is used to overwrite the datasets if they already exist. The data is read from the 'Product' sheet for the "Product" dataset and from the 'SalesOrderDetail' sheet for the "SalesOrderDetail" dataset.

SAS Code:

```
1  /*Data Import*/;
2  proc import out=Product datafile='/home/u63578004/BAN130NAA/AdventureWorks(2) (1).xlsx'
3  dbms=xlsx
4  replace;
5  sheet='Product';
6  run;
7
8  proc import out=SalesOrderDetail
9  datafile='/home/u63578004/BAN130NAA/AdventureWorks(2) (1).xlsx'
10 dbms=xlsx
11 replace;
12 sheet='SalesOrderDetail';
13
```

Screenshot:

2. **Data Cleaning**

The SAS code performs data cleaning for two datasets, "Product" and "SalesOrderDetail." For "Product," it handles missing values in the "Color" variable, converts "ListPrice" to numeric, and extracts selected variables. In "SalesOrderDetail," it renames and formats selected numeric variables, converts "ModifiedDate" to a date, and filters observations for the years 2013 and 2014. The code concludes by printing a sample of 10 observations from each cleaned dataset.

SAS Code:

```sas
data Product_clean;
set Product (keep= ProductID Name ProductNumber Color ListPrice
rename=(ListPrice=Char_ListPrice));
if missing(Color)
then Color = 'NA'; ListPrice = input(Char_ListPrice, dollar12.2);
format ListPrice dollar12.2;
drop Char_ListPrice;
run;

data SalesOrderDetail_Clean;
set SalesOrderDetail
(keep=SalesOrderID SalesOrderDetailID ProductID ModifiedDate UnitPrice LineTotal OrderQty
rename=(OrderQty=Char_OrderQty UnitPrice=Char_UnitPrice LineTotal=Char_LineTotal ModifiedDate=Char_ModifiedDate ));

OrderQty = input(Char_OrderQty, comma12.);
format OrderQty comma12.;
drop Char_OrderQty;

UnitPrice = input(Char_UnitPrice, dollar12.2);
format UnitPrice dollar12.2;
drop Char_UnitPrice;

LineTotal = input(Char_LineTotal, dollar12.2);
format LineTotal dollar12.2;
drop Char_LineTotal;

ModifiedDate =input(Char_ModifiedDate, yymmdd10.);
format ModifiedDate mmddyy10.;
drop Char_ModifiedDate;

if year(ModifiedDate) in (2013, 2014);
run;

title "Product_Clean Dataset - obs = 10";

proc print data = Product_Clean (obs = 10);
run;
title "SalesOrderDetail_Clean Dataset - obs = 10";
proc print data = SalesOrderDetail_Clean (obs = 10);
```

Screenshot:

Product_Clean Dataset - obs = 10

Obs	ProductID	Name	ProductNumber	Color	ListPrice
1	1	Adjustable Race	AR-5381	NA	$0.00
2	2	Bearing Ball	BA-8327	NA	$0.00
3	3	BB Ball Bearing	BE-2349	NA	$0.00
4	4	Headset Ball Bearings	BE-2908	NA	$0.00
5	316	Blade	BL-2036	NA	$0.00
6	317	LL Crankarm	CA-5965	Black	$0.00
7	318	ML Crankarm	CA-6738	Black	$0.00
8	319	HL Crankarm	CA-7457	Black	$0.00
9	320	Chainring Bolts	CB-2903	Silver	$0.00
10	321	Chainring Nut	CN-6137	Silver	$0.00

SalesOrderDetail_Clean Dataset - obs = 10

Obs	SalesOrderID	SalesOrderDetailID	ProductID	OrderQty	UnitPrice	LineTotal	ModifiedDate
1	49181	27406	794	1	$2,181.56	$2,181.56	01/01/2013
2	49182	27407	790	1	$2,443.35	$2,443.35	01/01/2013
3	49183	27408	791	1	$2,443.35	$2,443.35	01/01/2013
4	49184	27409	784	1	$2,049.10	$2,049.10	01/01/2013
5	49185	27410	784	1	$2,049.10	$2,049.10	01/01/2013
6	49186	27411	791	1	$2,443.35	$2,443.35	01/01/2013
7	49187	27412	796	1	$2,181.56	$2,181.56	01/01/2013
8	49188	27413	782	1	$2,049.10	$2,049.10	01/01/2013
9	49189	27414	769	1	$782.99	$782.99	01/01/2013
10	49190	27415	798	1	$1,000.44	$1,000.44	01/01/2013

3. Joining and Merging

The SAS code performs a dataset merge by sorting and combining the "SalesOrderDetail_Clean" and "Product_Clean" datasets based on the common key "ProductID." The resulting "salesdetails" dataset is then processed to calculate cumulative sales totals and quantities per product, leading to the creation of the "salesanalysis" dataset. This analysis serves to provide insights into product-level sales, with the first 10 observations displayed for both datasets.

SAS Code:

```sas
/*Joining and Merging*/
/* Sorting the dataset */
proc sort data=SalesOrderDetail_Clean;
by ProductID;
run;
proc sort data=Product_Clean;
by ProductID;
run;
/* Merging of both the datasets by productid as common key */

data salesdetails;
merge SalesOrderDetail_Clean(in=_sod) Product_Clean(in=_p);
by ProductID;
/*Droping the unwanted columns */
drop salesorderid salesorderdetailid productnumber listprice;
if _sod and _p;
/* formating the datafields as required */
format modifieddate mmddyy10.;
format unitprice linetotal dollar12.2;
run;
title "SalesDetails Dataset - 1st 10 observations";
proc print data = salesdetails (obs =10);


data salesanalysis;
set salesdetails;
by productid;
if first.productid then SubTotal=0;

if first.productid then Total_Qty=0;
SubTotal+linetotal; Total_Qty+OrderQty;
if last.productid;
format SubTotal dollar20.2;
drop orderqty;
rename Total_Qty = OrderQty;
run;

title "SalesAnalysis Dataset - 1st 10 observations";
proc print data=salesanalysis (obs = 10);
run;
```

Screenshot:

SalesDetails Dataset - 1st 10 observations

Obs	ProductID	OrderQty	UnitPrice	LineTotal	ModifiedDate	Name	Color
1	707	4	$20.19	$80.75	01/28/2013	Sport-100 Helmet, Red	Red
2	707	3	$20.19	$60.56	01/28/2013	Sport-100 Helmet, Red	Red
3	707	3	$20.19	$60.56	01/28/2013	Sport-100 Helmet, Red	Red
4	707	6	$20.19	$121.12	01/28/2013	Sport-100 Helmet, Red	Red
5	707	2	$20.19	$40.37	01/28/2013	Sport-100 Helmet, Red	Red
6	707	10	$20.19	$201.87	01/28/2013	Sport-100 Helmet, Red	Red
7	707	1	$20.19	$20.19	01/28/2013	Sport-100 Helmet, Red	Red
8	707	5	$20.19	$100.93	01/28/2013	Sport-100 Helmet, Red	Red
9	707	1	$20.19	$20.19	01/28/2013	Sport-100 Helmet, Red	Red
10	707	5	$20.19	$100.93	01/28/2013	Sport-100 Helmet, Red	Red

SalesAnalysis Dataset - 1st 10 observations

Obs	ProductID	UnitPrice	LineTotal	ModifiedDate	Name	Color	SubTotal	OrderQty
1	707	$34.99	$34.99	06/30/2014	Sport-100 Helmet, Red	Red	$126,263.88	4657
2	708	$34.99	$34.99	06/30/2014	Sport-100 Helmet, Black	Black	$126,940.27	4804
3	711	$34.99	$34.99	06/30/2014	Sport-100 Helmet, Blue	Blue	$128,596.20	4864
4	712	$8.99	$8.99	06/30/2014	AWC Logo Cap	Multi	$38,013.93	5718
5	713	$49.99	$49.99	06/30/2014	Long-Sleeve Logo Jersey, S	Multi	$21,445.71	429
6	714	$49.99	$49.99	06/30/2014	Long-Sleeve Logo Jersey, M	Multi	$77,087.41	2307
7	715	$49.99	$49.99	06/30/2014	Long-Sleeve Logo Jersey, L	Multi	$123,614.75	3935
8	716	$49.99	$49.99	06/30/2014	Long-Sleeve Logo Jersey, XL	Multi	$58,127.87	1676
9	717	$858.90	$1,717.80	05/01/2014	HL Road Frame - Red, 62	Red	$219,253.75	260
10	718	$858.90	$858.90	05/01/2014	HL Road Frame - Red, 44	Red	$220,112.65	261

4. **Data Analysis**

The SAS code performs targeted data analyses on the "salesanalysis" dataset, extracting information on sales of red-colored helmets, multi-colored items, combined sales of helmets, yellow-colored Touring-1000 products, and the total sales for the years 2013 and 2014. Each analysis is presented with relevant details, such as the quantity sold or total sales amount, providing valuable insights into specific product categories and overall sales performance during the specified period.

a.   How many Red color Helmets are sold in 2013 and 2014?

➢ As per the code and screenshot 4,657 red color helmets are sold in 2013 and 2014.

SAS Code:

```
title "Red color helmets sold in 2013 and 2014";
proc print data=salesanalysis;
where Color="Red" and Name like "%HELMET%";
sum OrderQty;
run;
```

Screenshot:

Red color helmets sold in 2013 and 2014

Obs	ProductID	UnitPrice	LineTotal	ModifiedDate	Name	Color	SubTotal	OrderQty
1	707	$34.99	$34.99	06/30/2014	Sport-100 Helmet, Red	Red	$126,263.88	4657
								4657

b. How many items sold in 2013 and 2014 have a Multi color?
➢ As per the code and screenshot 15,009 items sold in 2013-14 have a multi color.

SAS Code:

```
title "Multi colored items sold in 2013 and 2014";
proc print data=salesanalysis;
where color="Multi";
sum orderqty;
run;
```

Screenshot:

Multi colored items sold in 2013 and 2014

Obs	ProductID	UnitPrice	LineTotal	ModifiedDate	Name	Color	SubTotal	OrderQty
4	712	$8.99	$8.99	06/30/2014	AWC Logo Cap	Multi	$38,013.93	5718
5	713	$49.99	$49.99	06/30/2014	Long-Sleeve Logo Jersey, S	Multi	$21,445.71	429
6	714	$49.99	$49.99	06/30/2014	Long-Sleeve Logo Jersey, M	Multi	$77,087.41	2307
7	715	$49.99	$49.99	06/30/2014	Long-Sleeve Logo Jersey, L	Multi	$123,614.75	3935
8	716	$49.99	$49.99	06/30/2014	Long-Sleeve Logo Jersey, XL	Multi	$58,127.87	1676
97	855	$58.49	$116.99	02/28/2014	Men's Bib-Shorts, S	Multi	$15,784.25	292
98	856	$58.49	$233.97	04/30/2014	Men's Bib-Shorts, M	Multi	$26,208.29	491
99	857	$53.99	$161.98	04/30/2013	Men's Bib-Shorts, L	Multi	$8,693.03	161
								15009

c. What is the combined Sales total for all the helmets sold in 2013 and 2014?

➢ The combined sales total for all the helmets sold in 2013 and 2014 are $381,800.34

SAS Code:

```
title "Combined sales of helmets in 2013 and 2014";
proc print data=salesanalysis;
where name like "%Helmet%";
sum SubTotal;
run;
```

Screenshot:

Combined sales of helmets in 2013 and 2014

Obs	ProductID	UnitPrice	LineTotal	ModifiedDate	Name	Color	SubTotal	OrderQty
1	707	$34.99	$34.99	06/30/2014	Sport-100 Helmet, Red	Red	$126,263.88	4657
2	708	$34.99	$34.99	06/30/2014	Sport-100 Helmet, Black	Black	$126,940.27	4804
3	711	$34.99	$34.99	06/30/2014	Sport-100 Helmet, Blue	Blue	$128,596.20	4864
							$381,800.34	

d. How many Yellow Color Touring-1000 were sold in 2013 and 2014?

➢ As observed in the below output from the SAS code, 3,168 Yellow Color Touring- 1000 were sold in 2013-2014.

SAS Code:

```
title "Yellow Color Touring-1000 where sold in 2013 and 2014";
proc print data=salesanalysis;
where Color="Yellow" and Name like "%Touring-1000%";
sum orderqty;
run;
```

Screenshot:

Yellow Color Touring-1000 where sold in 2013 and 2014

Obs	ProductID	UnitPrice	LineTotal	ModifiedDate	Name	Color	SubTotal	OrderQty
194	954	$2,384.07	$2,384.07	05/30/2014	Touring-1000 Yellow, 46	Yellow	$1,426,372.87	1005
195	955	$2,384.07	$2,384.07	05/25/2014	Touring-1000 Yellow, 50	Yellow	$981,187.85	652
196	956	$2,384.07	$2,384.07	05/29/2014	Touring-1000 Yellow, 54	Yellow	$667,158.15	397
197	957	$2,384.07	$2,384.07	05/25/2014	Touring-1000 Yellow, 60	Yellow	$1,518,133.10	1114
								3168

e. What was the total sales in 2013 and 2014?
➢ The total sales in 2013 and 2014 is $3,361,386.19

SAS Code:

```
title "total sales in 2013 and 2014";
proc print data=salesanalysis;
sum SubTotal;
run;
```

Screenshot:

226	986	$564.99	$564.99	05/27/2014	Mountain-500 Silver, 44	Silver	$122,512.43	381
227	987	$564.99	$564.99	05/29/2014	Mountain-500 Silver, 48	Silver	$142,897.27	457
228	988	$564.99	$564.99	05/27/2014	Mountain-500 Silver, 52	Silver	$161,293.35	515
229	989	$539.99	$539.99	05/15/2014	Mountain-500 Black, 40	Black	$101,734.12	282
230	990	$539.99	$539.99	05/27/2014	Mountain-500 Black, 42	Black	$136,293.48	388
231	991	$539.99	$539.99	05/27/2014	Mountain-500 Black, 44	Black	$125,925.67	350
232	992	$539.99	$539.99	05/28/2014	Mountain-500 Black, 48	Black	$157,569.08	449
233	993	$539.99	$539.99	05/26/2014	Mountain-500 Black, 52	Black	$96,982.20	272
234	994	$32.39	$97.18	05/01/2014	LL Bottom Bracket	NA	$12,244.93	378
235	996	$72.89	$218.68	05/01/2014	HL Bottom Bracket	NA	$39,581.44	543
236	997	$539.99	$539.99	05/30/2014	Road-750 Black, 44	Black	$290,298.62	656
237	998	$539.99	$539.99	05/30/2014	Road-750 Black, 48	Black	$578,174.31	1556
238	999	$539.99	$539.99	05/30/2014	Road-750 Black, 52	Black	$515,666.91	1338
							$63,680,407.86	

5. Chart :

The provided SAS code generates a pie chart titled "Product Count by Color," visually representing the distribution of product counts across different colors in the "SALESANALYSIS" dataset. The chart enhances the project's analysis by offering a clear and concise visualization of the color-based composition of the product sales data.

SAS code:

```
*Chart;

title "Product Count by Color";
proc template;
define statgraph SASStudio.Pie;
begingraph;
layout region;
piechart category = Color / datalabellocation=callout dataskin=gloss;
endlayout;
endgraph;
end;
run;

ods graphics / reset width=6.4in height=4.8in imagemap;
proc sgrender template=SASStudio.Pie data=work.SALESANALYSIS;
run;
ods graphics / reset;
```

Screenshot:

Product Count by Color