

IS 665 Data Analysis for Information Systems
Technical Assignment 2
Group 8

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Part I. Statistics (60 pts.)

Question 1 : What product sold the least number of units?

Step 1 : Pivot Table was created using the data and Columns, Rows and Values tables were filled accordingly.

The screenshot shows an Excel spreadsheet with a PivotTable and the PivotTable Fields task pane. The PivotTable is located in the range R18C2 to R38C2. The PivotTable Fields task pane is on the right side of the screen.

PivotTable Fields Task Pane:

- Choose fields to add to report: Search
- ☐ Country
- ☐ OrderNumber
- ☐ OrderItem
- ☐ Product
- ☒ ProductDescr
- ☒ Product Category
- ☐ Division
- ☒ SalesQuantity
- ☐ UnitOfMeasure
- ☐ Revenue

Drag fields between areas below:

Filters	Columns

Rows	Values
Product Category	Sum of SalesQuantity
ProductDescr	

☐ Defer Layout Update Update

PivotTable Data:

Row Labels	Sum of SalesQuantity
ACC	66941
Air Pump	22980
Elbow Pads	1653
First Aid Kit	7877
Knee Pads	1659
Off Road Helmet	3926
Repair Kit	3879
Road Helmet	3961
T-shirt	3883
Water Bottle	3841
Water Bottle Cage	13282
EBI	868
E-Bike Tailwind	868
ORB	38675
Men's Off Road Bike Fully	11693
Men's Off Road Bike Hard Tail (Shimano)	8550
Men's Off Road Bike Hard Tail (SRAM)	13338
Women's Off Road Bike Fully	5094
ROB	29049
Deluxe Road Bike (Shimano)	13365
Deluxe Road Bike (SRAM)	3963
Professional Road Bike (Campagnolo)	1640
Professional Road Bike (Shimano)	8484
Professional Road Bike (SRAM)	1597
TOU	32887
Deluxe Touring Bike (black)	3863
Deluxe Touring Bike (red)	3953
Deluxe Touring Bike (silver)	8356
Professional Touring Bike (black)	4091
Professional Touring Bike (red)	3876
Professional Touring Bike (silver)	8748
TRE	434
City Bike Max	362
Fixed Gear Bike Plus	72
Grand Total	168854

Step 2 : Conditional Formatting feature of Excel was used to highlight the 'Bottom 3 values' from the data.

The screenshot shows an Excel spreadsheet with a PivotTable. The PivotTable is titled 'Sum of SalesQuantity' and has 'Row Labels' as the filter. The data is organized into categories: ACC, EBI, ORB, ROB, TOU, and TRE. The 'TRE' category is highlighted in red, indicating it is the bottom 3 values. A dialog box titled 'Bottom 10 Items' is open, showing the 'Format cells that rank in the BOTTOM:' option. The dialog box also shows the 'Light Red Fill with Dark Red Text' format.

Row Labels	Sum of SalesQuantity
ACC	66941
Air Pump	22380
Elbow Pads	1653
First Aid Kit	7877
Knee Pads	1659
Off Road Helmet	3926
Repair Kit	3879
Road Helmet	3961
T-shirt	3883
Water Bottle	3841
Water Bottle Cage	13282
EBI	868
E-Bike Tailwind	868
ORB	38675
Men's Off Road Bike Fully	11693
Men's Off Road Bike Hard Tail (Shimano)	8350
Men's Off Road Bike Hard Tail (SRAM)	13338
Women's Off Road Bike Fully	5094
ROB	29049
Deluxe Road Bike (Shimano)	13365
Deluxe Road Bike (SRAM)	3963
Professional Road Bike (Campagnolo)	1640
Professional Road Bike (Shimano)	8484
Professional Road Bike (SRAM)	1597
TOU	32887
Deluxe Touring Bike (black)	3862
Deluxe Touring Bike (red)	3953
Deluxe Touring Bike (silver)	8356
Professional Touring Bike (black)	4091
Professional Touring Bike (red)	3876
Professional Touring Bike (silver)	8748
TRE	434
City Bike Max	362
Fixed Gear Bike Plus	72
Grand Total	168854

Step 3 : Hence, from our observation we can see that **‘Fixed Gear Bike Plus’** is the least sold product under the **‘TRE’** product category.

Product Category	Product Descr	Sum of SalesQuantity
ACC		66941
	Air Pump	22980
	Elbow Pads	1653
	First Aid Kit	7877
	Knee Pads	1659
	Off Road Helmet	3926
	Repair Kit	3879
	Road Helmet	3961
	T-shirt	3883
	Water Bottle	3841
	Water Bottle Cage	13282
EBI		868
	E-Bike Tailwind	868
ORB		38675
	Men's Off Road Bike Fully	11693
	Men's Off Road Bike Hard Tail (Shimano)	8550
	Men's Off Road Bike Hard Tail (SRAM)	13338
	Women's Off Road Bike Fully	5094
ROB		29049
	Deluxe Road Bike (Shimano)	13365
	Deluxe Road Bike (SRAM)	3963
	Professional Road Bike (Campagnolo)	1640
	Professional Road Bike (Shimano)	8484
	Professional Road Bike (SRAM)	1597
TOU		32887
	Deluxe Touring Bike (black)	3863
	Deluxe Touring Bike (red)	3953
	Deluxe Touring Bike (silver)	8356
	Professional Touring Bike (black)	4091
	Professional Touring Bike (red)	3876
	Professional Touring Bike (silver)	8748
TRE		434
	City Bike Max	362
	Fixed Gear Bike Plus	72
Grand Total		168854

Question 1 : What product sold the least number of units?

Answer 1 : Fixed Gear Bike Plus (TRE product category)

Question 2 : What product category provided the most revenue in 2011?

Step 1 : Pivot table is created with the relevant rows and values. Year is added as a filter

The screenshot shows the Excel interface with the PivotTable Tools ribbon active. The PivotTable Fields task pane on the right is configured with the following settings:

- Filters:** YEAR
- Columns:** (Empty)
- Rows:** Product Category
- Values:** Sum of SalesQuantity

The PivotTable data is displayed in the range R3C1:R10C2:

YEAR	(All)
ACC	66941
EBI	868
ORB	38675
ROB	29049
TOU	32887
TRE	434
Grand Total	168854

Step 2 : The year '2011' is selected the values in the pivot table is sorted.

The screenshot shows the Excel interface with the PivotTable Tools ribbon active. The PivotTable Fields task pane on the right is configured with the following settings:

- Filters:** YEAR
- Columns:** (Empty)
- Rows:** Product Category
- Values:** Sum of SalesQuantity

The PivotTable data is displayed in the range R4C2:R10C2:

YEAR	2011
ACC	12487
ORB	726
TOU	604
ROB	558
EBI	42
TRE	7
Grand Total	3188

A context menu is open over the PivotTable, showing the 'Sort' option selected, with 'Sort Smallest to Largest' and 'Sort Largest to Smallest' options available.

Step 3 : Here we can see that the product category 'ACC' provided the most revenue in the 2011

The screenshot shows an Excel spreadsheet with a PivotTable and the PivotTable Fields task pane. The PivotTable is located in the range R4C2 to R10C2. The PivotTable Fields task pane is on the right side of the screen.

PivotTable Data:

Row Labels	Sum of SalesQuantity
ACC	12487
ORB	7266
TOU	6044
ROB	5581
EBI	428
TRE	74
Grand Total	31880

PivotTable Fields Task Pane:

- Choose fields to add to report:**
 - ☒ YEAR
 - ☐ MONTH
 - ☐ DAY
 - ☐ Customer
 - ☐ CustomerDescr
 - ☐ City
 - ☐ Salesorg
 - ☐ Country
 - ☐ OrderNumber
 - ☐ OrderItem
- Drag fields between areas below:**
 - Filters:** YEAR
 - Columns:**
 - Rows:** Product Category
 - Values:** Sum of SalesQuantity
- ☐ Defer Layout Update
- Update**

Question 2 : What product category provided the most revenue in 2011?

Answer 2 : Product category 'ACC' provided the most revenue in 2011

Question 3 : a) What percentage did the off-road bikes contribute to the overall bicycle sales quantity?

Step 1 : Create a pivot table filling in the relevant Pivot table fields i.e. Year, Product category, Descr, Sum of sales quantity

The screenshot shows an Excel spreadsheet with a PivotTable and the PivotTable Fields task pane. The PivotTable is located in the range A1:B28 and summarizes sales data by year and product category. The PivotTable Fields task pane is open on the right, showing the fields available for the report.

PivotTable Data:

YEAR	Sum of SalesQuantity
ACC	66941
ORB	38675
Men's Off Road Bike Fully	11693
Men's Off Road Bike Hard Tail (Shimano)	8550
Men's Off Road Bike Hard Tail (SRAM)	13338
Women's Off Road Bike Fully	5094
TOU	32887
Deluxe Touring Bike (black)	3863
Deluxe Touring Bike (red)	3953
Deluxe Touring Bike (silver)	8356
Professional Touring Bike (black)	4091
Professional Touring Bike (red)	3876
Professional Touring Bike (silver)	8748
ROB	29049
Deluxe Road Bike (Shimano)	13365
Deluxe Road Bike (SRAM)	3963
Professional Road Bike (Campagnolo)	1640
Professional Road Bike (Shimano)	8484
Professional Road Bike (SRAM)	1597
EBI	868
E-Bike Tailwind	868
TRE	434
City Bike Max	362
Fixed Gear Bike Plus	72
Grand Total	168854

PivotTable Fields Task Pane:

- Choose fields to add to report:**
 - ☐ Country
 - ☐ OrderNumber
 - ☐ OrderItem
 - ☐ Product
 - ☒ ProductDescr
 - ☒ Product Category
 - ☐ Division
 - ☒ SalesQuantity
 - ☐ UnitOfMeasure
 - ☐ Revenue
- Drag fields between areas below:**
 - Filters:** YEAR
 - Columns:**
 - Rows:** Product Category, ProductDescr
 - Values:** Sum of SalesQuantity
- ☐ Defer Layout Update
- Update**

Step 2 : Right-click on values and select '% of Column Total' to display values in percentage

The screenshot shows an Excel PivotTable with the following data:

YEAR	Sum of SalesQuantity
ACC	8550
ORB	
Men's Off Road Bike Fully	
Men's Off Road Bike Hard Tail (Shimano)	
Men's Off Road Bike Hard Tail (SRAM)	
Women's Off Road Bike Fully	
TOU	
Deluxe Touring Bike (black)	
Deluxe Touring Bike (red)	
Deluxe Touring Bike (silver)	
Professional Touring Bike (black)	
Professional Touring Bike (red)	
Professional Touring Bike (silver)	
ROB	
Deluxe Road Bike (Shimano)	
Deluxe Road Bike (SRAM)	
Professional Road Bike (Campagnolo)	
Professional Road Bike (Shimano)	
Professional Road Bike (SRAM)	
EBI	
E-Bike Tailwind	
TRE	
City Bike Max	
Fixed Gear Bike Plus	
Grand Total	168854

Step 3 : We can clearly see that Off-Road bike (ORB) contributed almost 23% of the overall sales quantity.

The screenshot shows the same Excel PivotTable, but the values are now displayed as percentages:

YEAR	Sum of SalesQuantity
ACC	39.64%
ORB	22.90%
Men's Off Road Bike Fully	6.92%
Men's Off Road Bike Hard Tail (Shimano)	5.06%
Men's Off Road Bike Hard Tail (SRAM)	7.90%
Women's Off Road Bike Fully	3.02%
TOU	19.48%
Deluxe Touring Bike (black)	2.29%
Deluxe Touring Bike (red)	2.34%
Deluxe Touring Bike (silver)	4.95%
Professional Touring Bike (black)	2.42%
Professional Touring Bike (red)	2.30%
Professional Touring Bike (silver)	5.18%
ROB	17.20%
Deluxe Road Bike (Shimano)	7.92%
Deluxe Road Bike (SRAM)	2.35%
Professional Road Bike (Campagnolo)	0.97%
Professional Road Bike (Shimano)	5.02%
Professional Road Bike (SRAM)	0.95%
EBI	0.51%
E-Bike Tailwind	0.51%
TRE	0.26%
City Bike Max	0.21%
Fixed Gear Bike Plus	0.04%
Grand Total	100.00%

Question 3 : a) What percentage did the off-road bikes contribute to the overall bicycle sales quantity?

Answer 3 : a) Accessory sales = 40% , Offroad Bike sales = 23%,

Total Bike sales = $100 - 40 = 60\%$

Off-road bike sales contribution to the overall bicycle sales = $(23/100) \times 60 = 14\%$ (approx.)

Question 3 : Part b) In which three cities was this percentage significantly above the average?

Step 1 : The same pivot table is used and 'City' Pivot Field is added in the 'Columns'.

Excel | Srijan Deo | SalesdataPivotV01.xlsx - Excel

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Clipboard: Paste, Cut, Copy, Format Painter

Font: Calibri, 11, Bold, Italic, Underline, Text Color, Fill Color

Alignment: Wrap Text, Merge & Center

Number: General, Currency, Percentage, Date, Time, Text, Accounting

Conditional Formatting, Format as Table, Cell Styles, Insert, Delete, Format

Editing: Fill, Clear, Sort & Filter, Find & Select

YEAR	(All)											
Sum of SalesQuantity	Column Labels											
Row Labels	Anklam	Atlanta	Berlin	Bochum	Boston	Chicago	Denver	Detroit	Frankfurt	Grand Rapids	Hamburg	Hannover
ACC	42.01%	40.78%	39.95%	40.65%	40.10%	40.04%	34.95%	39.01%	40.43%	41.20%	41.01%	
ORB	22.07%	22.11%	20.28%	20.73%	21.01%	21.43%	33.03%	21.34%	20.94%	21.94%	20.42%	
Men's Off Road Bike Fully	5.25%	5.81%	5.40%	5.10%	5.75%	5.33%	14.29%	4.81%	5.66%	5.52%	5.05%	
Men's Off Road Bike Hard Tail (Shimano)	4.79%	5.46%	4.98%	4.96%	5.08%	4.89%	5.08%	6.16%	5.38%	6.04%	5.41%	
Men's Off Road Bike Hard Tail (SRAM)	9.84%	8.51%	7.30%	8.04%	7.75%	8.83%	6.79%	8.32%	7.56%	8.56%	7.70%	
Women's Off Road Bike Fully	2.20%	2.33%	2.60%	2.63%	2.43%	2.38%	6.86%	2.05%	2.34%	1.82%	2.25%	
TOU	18.47%	19.22%	20.88%	19.57%	20.46%	20.47%	16.67%	20.74%	20.12%	20.24%	19.67%	
ROB	16.60%	17.70%	17.48%	17.75%	18.12%	17.89%	15.17%	18.71%	17.50%	16.63%	17.69%	
EBI	0.82%	0.00%	1.04%	1.13%	0.00%	0.00%	0.00%	0.00%	0.85%	0.00%	0.95%	
TRE	0.03%	0.18%	0.36%	0.17%	0.31%	0.17%	0.19%	0.20%	0.16%	0.00%	0.27%	
Grand Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	

PivotTable Fields

Choose fields to add to report:

- ☐ CustomerDescr
- ☒ City
- ☐ Salesorg
- ☐ Country
- ☐ OrderNumber
- ☐ OrderItem
- ☐ Product
- ☒ ProductDescr
- ☒ Product Category
- ☐ Division

Drag fields between areas below:

Filters: YEAR

Columns: City

Rows: Product Category, ProductDescr

Values: Sum of SalesQuantity

☐ Defer Layout Update

Step 2 : Entire row for 'Off-Road bike' is selected for further analysis

SalesDataPivotV01.xlsx - Excel

FileHomeInsertFormulasDataReviewViewHelpJMPAnalyzeDesignTell me what you want to doShare

CutCopyFormat PainterClipboardFontAlignmentNumberStylesCellsEditing

Calibri11A^A_aBBIUColorFillMerge & CenterGeneral\$- % ' < > + 0.00 < - 0.00Conditional FormattingFormat as TableCell StylesInsertDeleteFormatAutoSumFillClearSort & FindFilterSelect

R6C1X✓fxORB

Column Labels ↓	Ankiam	Atlanta	Berlin	Bochum	Boston	Chicago	Denver	Detroit	Frankfurt	Grand Rapids	Hamburg	Hannover	Heidelberg	Irvine	Leipzig	Magdeburg	München	New York City	Palo Alto	Philadelphia	Seattle	Stuttgart	Washington DC	Grand Total	
Sum of SalesQuantity		42.01%	40.78%	39.95%	40.65%	40.10%	40.04%	34.95%	39.01%	40.43%	41.20%	41.01%	39.42%	36.61%	41.96%	40.48%	42.18%	33.99%	40.41%	40.54%	40.53%	41.77%	42.20%	40.40%	39.64%
Row Labels		22.07%	22.11%	20.28%	20.73%	21.01%	21.43%	33.03%	21.34%	20.94%	21.94%	20.42%	21.95%	28.06%	22.44%	22.00%	20.26%	32.64%	20.22%	20.42%	20.90%	20.57%	21.02%	21.02%	22.90%
ACC		5.23%	5.61%	5.40%	5.10%	5.75%	5.33%	14.22%	4.81%	5.60%	5.52%	5.05%	5.66%	10.74%	5.71%	5.87%	4.50%	13.32%	4.86%	5.87%	5.75%	4.66%	5.32%	5.10%	6.52%
Men's Off Road Bike Fully		4.79%	5.46%	4.98%	4.96%	5.08%	4.89%	5.08%	6.16%	5.38%	6.04%	5.41%	4.87%	5.25%	5.56%	5.48%	5.07%	3.97%	5.05%	4.38%	5.49%	5.55%	4.80%	5.68%	5.06%
Men's Off Road Bike Hard Tail (Shimano)		9.84%	8.51%	7.30%	8.04%	7.75%	8.83%	6.79%	8.32%	7.56%	8.56%	7.70%	9.20%	7.23%	8.73%	8.81%	8.57%	6.89%	7.91%	7.90%	7.21%	7.79%	8.42%	8.09%	7.90%
Women's Off Road Bike Fully		2.20%	2.33%	2.60%	2.63%	2.43%	2.38%	6.86%	2.05%	2.34%	1.82%	2.25%	2.22%	4.84%	2.44%	1.84%	2.06%	6.45%	2.41%	2.26%	2.45%	2.58%	2.48%	2.14%	3.02%
TOTU		18.47%	19.22%	20.88%	19.57%	20.46%	20.47%	16.67%	20.74%	20.12%	20.24%	19.67%	20.76%	18.15%	19.20%	18.87%	19.07%	16.72%	20.86%	20.91%	20.58%	18.84%	18.83%	20.73%	19.48%
ROB		16.60%	17.70%	17.48%	17.75%	18.11%	17.89%	15.17%	18.71%	17.50%	16.63%	17.69%	16.66%	15.99%	16.21%	17.47%	17.43%	15.52%	18.23%	17.66%	17.78%	18.64%	16.58%	17.62%	17.20%
EBI		0.82%	0.00%	1.04%	1.13%	0.00%	0.00%	0.00%	0.00%	0.85%	0.00%	0.95%	0.97%	0.97%	0.00%	0.96%	0.95%	0.77%	0.00%	0.00%	0.00%	0.00%	1.08%	0.00%	0.51%
TRI		0.03%	0.18%	0.36%	0.17%	0.31%	0.17%	0.19%	0.20%	0.16%	0.00%	0.27%	0.23%	0.21%	0.19%	0.22%	0.11%	0.36%	0.28%	0.47%	0.21%	0.18%	0.30%	0.24%	0.26%
Grand Total		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	

Sheet1Sheet3Sheet2Sheet5Sheet4SalesDataPivotV01Average: 0.224874945Count: 25Sum: 5.39699869

Step 3 : Conditional formatting is used to highlight cells with Above Average percentage values

File Home Insert Formulas Data Review View Help JMP Analyze Design Tell me what you want to do

Clipboard Font Alignment Number

Conditional Formatting Format as Table Cell Styles

Insert Delete Format

AutoSum Fill Sort & Find & Filter Select Clear

Editing

Highlight Cells Rules

Top/Bottom Rules

Top 10 Items...

Top 10 %...

Bottom 10 Items...

Bottom 10 %...

Above Average...

Below Average...

More Rules...

Data Bars

Color Scales

Icon Sets

New Rule...

Clear Rules

Manage Rules...

Sum of Sales/Quantity

Column Labels

	Ankiam	Atlanta	Berlin	Bochum	Boston	Chicago	Denver	Detroit	Frankfurt	Grand Rapids	Hamburg	H
ACC	42.01%	40.78%	39.95%	40.65%	40.10%	40.04%	34.95%	39.01%	40.43%	41.20%	41.01%	
ORB	22.07%	22.11%	20.28%	20.73%	21.01%	21.43%	33.03%	21.34%	20.94%	21.94%	20.42%	
Men's Off Road Bike Fully	5.23%	5.61%	5.40%	5.10%	5.75%	5.33%	14.22%	4.81%	5.60%	5.52%	5.05%	
Men's Off Road Bike Hard Tail (Shimano)	4.79%	5.46%	4.98%	4.96%	5.08%	4.89%	5.08%	6.16%	5.38%	6.04%	5.41%	
Men's Off Road Bike Hard Tail (SRAM)	9.84%	8.51%	7.30%	8.04%	7.75%	8.83%	6.79%	8.32%	7.56%	8.56%	7.70%	
Women's Off Road Bike Fully	2.20%	2.33%	2.60%	2.63%	2.43%	2.38%	6.86%	2.05%	2.34%	1.82%	2.25%	
TOU	18.47%	19.22%	20.88%	19.57%	20.46%	20.47%	16.67%	20.74%	20.12%	20.24%	19.67%	
ROB	16.60%	17.70%	17.48%	17.75%	18.12%	17.89%	15.17%	18.71%	17.50%	16.63%	17.69%	
EBI	0.82%	0.00%	1.04%	1.13%	0.00%	0.00%	0.00%	0.00%	0.85%	0.00%	0.95%	
TRE	0.03%	0.18%	0.36%	0.17%	0.31%	0.17%	0.19%	0.20%	0.16%	0.00%	0.27%	
Grand Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	

Sheet1 Sheet3 Sheet2 Sheet5 Sheet4 SalesDataPivotV01

Average: 0.224874945 Count: 25 Sum: 5.39699869

Step 1 : Pivot table is created with 'Month' in the 'Columns' field.

The screenshot displays the Microsoft Excel interface with a PivotTable and the PivotTable Fields task pane.

PivotTable Fields Task Pane:

- Choose fields to add to report:**
 - ☒ YEAR
 - ☒ MONTH
 - ☐ DAY
 - ☐ Customer
 - ☐ CustomerDescr
 - ☐ City
 - ☐ Salesorg
 - ☐ Country
 - ☐ OrderNumber
 - ☐ OrderItem
- Drag fields between areas below:**
 - Filters:** YEAR (dropdown)
 - Columns:** MONTH (dropdown)
 - Rows:** Product Category (dropdown), ProductDescr (dropdown)
 - Values:** Sum of SalesQuantity (dropdown)
- ☐ Defer Layout Update
-

PivotTable Data:

YEAR	MONTH	Sum of SalesQuantity
2019	Jan	47.97%
2019	Feb	41.34%
2019	Mar	41.38%
2019	Apr	38.99%
2019	May	38.05%
2019	Jun	37.70%
2019	Jul	38.76%
2019	Aug	39.64%
2019	Sep	39.54%
2019	Oct	42.06%
2019	Nov	47.95%
2019	Dec	47.90%
2019	Grand Total	39.64%

Step 2 : With 'Month' in the column field, we can consider Month 3(March)- Month 8(August) as Spring and Summer and Month 9(September) – Month 2(February) as Fall and Winter. Again we apply conditional formatting to the cells.

FileHomeInsertFormulasDataReviewViewHelpJMPAnalyzeDesignTell me what you want to do

CutCopyFormat PainterClipboard

Calibri11A⁺A⁻

B

I

U

Font

Alignment

Wrap Text

Merge & Center

Percentage

Number

Conditional Formatting

Format as Table

Cell Styles

Highlight Cells Rules

Top/Bottom Rules

Data Bars

Color Scales

Icon Sets

New Rule...

Clear Rules

Manage Rules...

AutoSum

Fill

Clear

Sort & Find

Find & Select

Editing

R37C2

0%

1

2

3

4

5

6

7

8

9

10

11

12

YEAR

(All)

Sum of SalesQuantity

Column Labels

Row Labels

1

2

3

4

5

6

7

8

9

10

11

ACC

47.97%

43.34%

41.38%

38.99%

38.05%

37.70%

38.76%

39.64%

39.54%

42.06%

47.95%

Air Pump

14.83%

14.07%

13.90%

13.81%

13.50%

13.55%

13.38%

13.41%

13.26%

13.13%

15.18%

First Aid Kit

0.21%

0.46%

0.76%

1.01%

1.22%

1.19%

1.06%

1.01%

0.87%

0.70%

0.13%

Knee Pads

16.38%

10.44%

7.61%

2.85%

2.36%

1.82%

3.88%

4.17%

4.88%

8.30%

17.63%

Off Road Helmet

0.29%

0.51%

0.74%

1.11%

1.16%

1.24%

0.98%

0.93%

0.85%

0.70%

0.23%

Repair Kit

1.73%

1.87%

2.06%

2.43%

2.44%

2.47%

2.36%

2.46%

2.30%

2.30%

1.43%

Road Helmet

1.76%

1.89%

2.01%

2.22%

2.45%

2.50%

2.57%

2.34%

2.26%

1.95%

1.59%

T-shirt

1.81%

1.87%

2.33%

2.49%

2.28%

2.62%

2.32%

2.41%

2.43%

2.15%

1.56%

Water Bottle

1.94%

2.17%

2.13%

2.53%

2.52%

2.28%

2.29%

2.46%

2.30%

2.13%

1.30%

Water Bottle Cage

1.58%

1.77%

2.11%

2.51%

2.43%

2.32%

2.42%

2.27%

2.20%

1.95%

1.56%

OROB

7.43%

8.29%

7.66%

8.44%

7.61%

7.63%

7.59%

8.02%

8.10%

8.61%

7.33%

Men's Off Road Bike Fully

21.16%

22.75%

23.28%

22.91%

22.97%

23.19%

23.28%

22.86%

23.09%

21.53%

22.87%

21.45%

Men's Off Road Bike Hard Tail (Shimano)

5.99%

7.21%

7.53%

6.63%

6.78%

7.22%

7.21%

6.71%

6.64%

6.69%

7.28%

6.67%

Men's Off Road Bike Hard Tail (SRAM)

4.65%

5.06%

4.88%

5.45%

5.28%

4.96%

5.35%

4.83%

5.05%

4.33%

4.83%

4.28%

Women's Off Road Bike Fully

7.77%

7.68%

7.96%

7.73%

7.85%

7.94%

7.42%

7.29%

8.09%

8.01%

8.24%

7.75%

TOU

2.76%

2.80%

2.90%

3.00%

3.07%

3.07%

3.10%

3.02%

3.32%

2.49%

2.52%

2.75%

Deluxe Touring Bike (black)

16.57%

17.82%

18.83%

18.98%

20.41%

20.50%

19.28%

19.69%

18.97%

18.27%

14.73%

15.87%

Deluxe Touring Bike (red)

1.63%

1.82%

2.24%

2.28%

2.44%

2.53%

2.33%

2.28%

2.15%

2.16%

1.48%

1.70%

Deluxe Touring Bike (silver)

1.79%

1.82%

2.20%

2.44%

2.48%

2.56%

2.29%

2.44%

2.23%

2.04%

1.61%

1.59%

Professional Touring Bike (black)

4.59%

5.06%

5.21%

5.10%

5.07%

5.05%

4.81%

4.65%

4.82%

4.83%

4.31%

4.94%

Professional Touring Bike (silver)

1.81%

1.80%

2.24%

2.28%

2.56%

2.69%

2.55%

2.56%

2.48%

2.34%

1.51%

1.43%

Professional Touring Bike (red)

1.73%

2.02%

1.94%

2.42%

2.43%

2.39%

2.52%

2.50%

2.26%

1.92%

1.27%

1.40%

Professional Touring Bike (silver)

4.83%

5.30%

5.00%

5.38%

5.43%

5.28%

4.78%

5.26%

5.03%

4.98%

4.55%

4.81%

ROB

14.07%

15.59%

15.96%

17.33%

17.69%

17.60%

18.03%

17.17%

17.62%

17.56%

14.09%

14.53%

Deluxe Road Bike (Shimano)

7.38%

7.99%

7.39%

7.88%

7.81%

7.77%

8.47%

7.80%

8.35%

8.21%

7.41%

8.32%

Deluxe Road Bike (SRAM)

1.42%

1.92%

2.28%

2.47%

2.61%

2.41%

2.22%

2.39%

2.42%

2.43%

1.82%

1.21%

Professional Road Bike (Campagnolo)

0.32%

0.50%

0.69%

1.06%

1.04%

1.25%

1.08%

1.00%

0.83%

0.78%

0.18%

0.19%

Professional Road Bike (Shimano)

4.80%

4.79%

4.81%

5.16%

5.04%

5.23%

4.95%

5.15%

5.49%

4.44%

4.58%

5.02%

Professional Road Bike (SRAM)

0.16%

0.43%

0.80%

1.06%

1.05%

1.15%

1.03%

1.03%

0.86%

0.65%

0.23%

0.25%

EBI

0.24%

0.48%

0.52%

0.55%

0.51%

0.57%

0.43%

0.47%

0.65%

0.57%

0.36%

0.25%

E-bike Tailwind

0.24%

0.48%

0.52%

0.55%

0.51%

0.57%

0.43%

0.47%

0.65%

0.57%

0.36%

0.25%

TRE

0.00%

0.02%

0.05%

0.33%

0.37%

0.44%

0.23%

0.17%

0.13%

0.02%

0.00%

0.00%

City Bike Max

0.00%

0.02%

0.05%

0.29%

0.30%

0.34%

0.21%

0.15%

0.12%

0.02%

0.00%

0.00%

Fixed Gear Bike Plus

0.00%

0.00%

0.00%

0.04%

0.06%

0.10%

0.02%

0.03%

0.01%

0.00%

0.00%

0.00%

Grand Total

100.00%

100.00%

100.00%

100.00%

100.00%

100.00%

100.00%

100.00%

100.00%

100.00%

100.00%

100.00%

PivotTable Fields

Choose fields to add to report:

MONTH

☐

DAY

☐

Customer

☐

CustomerDescr

☐

City

☐

Salesorg

☐

Country

☐

OrderNumber

☐

OrderItem

☐

Product

Drag fields between areas below:

Filters

YEAR

Columns

MONTH

Rows

Product Category

ProductDescr

Values

Sum of SalesQuantity

Defer Layout Update

Update

Sheet1Sheet2Sheet4Sheets5SalesdataPivotV01

Average: 0.07%Count: 24Sum: 1.75%

Step 3 : It is clear that ‘Air Pump’ and ‘First Aid Kit’ are the two products which have more sales in fall and winter rather than in spring and summer.

Row Labels	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Grand Total
=ACC		47.97%	43.34%	41.38%	38.99%	38.05%	37.70%	38.76%	39.64%	39.54%	42.06%	47.95%	47.90%		39.64%
Air Pump		14.83%	14.07%	13.90%	13.81%	13.50%	13.55%	13.38%	13.41%	13.26%	13.13%	15.18%	13.79%		13.61%
Elbow Pads		0.21%	0.46%	0.78%	1.01%	1.22%	1.19%	1.06%	1.01%	0.87%	0.70%	0.13%	0.19%		0.98%
First Aid Kit		16.38%	10.44%	7.61%	2.85%	2.36%	1.82%	3.88%	4.17%	4.88%	8.30%	17.65%	17.93%		4.66%
Knee Pads		0.29%	0.51%	0.74%	1.11%	1.16%	1.24%	0.98%	0.93%	0.85%	0.70%	0.23%	0.25%		0.98%
Off Road Helmet		1.73%	1.87%	2.06%	2.43%	2.44%	2.47%	2.36%	2.46%	2.30%	2.30%	1.43%	1.62%		2.33%
Repair Kit		1.76%	1.89%	2.01%	2.22%	2.45%	2.50%	2.57%	2.34%	2.26%	1.95%	1.59%	1.54%		2.30%
Road Helmet		1.81%	1.87%	2.33%	2.49%	2.28%	2.62%	2.32%	2.41%	2.43%	2.15%	1.56%	1.48%		2.35%
T-shirt		1.94%	2.17%	2.13%	2.43%	2.52%	2.28%	2.29%	2.46%	2.30%	2.13%	1.30%	1.59%		2.30%
Water Bottle		1.58%	1.77%	2.15%	2.21%	2.51%	2.41%	2.32%	2.42%	2.27%	2.09%	1.56%	1.68%		2.27%
Water Bottle Cage		7.43%	8.29%	7.66%	8.44%	7.61%	7.63%	7.59%	8.02%	8.10%	8.61%	7.33%	7.83%		7.87%
=ORB		21.16%	22.75%	23.28%	22.91%	22.97%	23.19%	23.28%	22.86%	23.09%	21.53%	22.87%	21.45%		22.90%
Men's Off Road Bike Fully		5.99%	7.21%	7.53%	6.63%	6.78%	7.22%	7.21%	6.71%	6.64%	6.69%	7.28%	6.67%		6.92%
Men's Off Road Bike Hard Tail (Shimano)		4.65%	5.06%	4.88%	5.45%	5.28%	4.96%	5.35%	4.83%	5.05%	4.33%	4.83%	4.28%		5.06%
Men's Off Road Bike Hard Tail (SRAM)		7.77%	7.68%	7.96%	7.73%	7.85%	7.94%	7.62%	8.29%	8.09%	8.01%	8.24%	7.75%		7.90%
Women's Off Road Bike Fully		2.76%	2.80%	2.90%	3.09%	3.07%	3.07%	3.10%	3.02%	3.32%	2.49%	2.52%	2.75%		3.02%
=TOU		16.57%	17.82%	18.83%	19.89%	20.41%	20.50%	19.28%	19.69%	18.97%	18.27%	14.73%	15.87%		19.48%
Deluxe Touring Bike (black)		1.63%	1.82%	2.24%	2.28%	2.44%	2.53%	2.33%	2.28%	2.15%	2.16%	1.48%	1.70%		2.29%
Deluxe Touring Bike (red)		1.97%	1.82%	2.20%	2.44%	2.48%	2.56%	2.29%	2.44%	2.23%	2.04%	1.61%	1.59%		2.34%
Deluxe Touring Bike (silver)		4.59%	5.06%	5.21%	5.10%	5.07%	5.05%	4.81%	4.65%	4.82%	4.83%	4.31%	4.94%		4.95%
Professional Touring Bike (black)		1.81%	1.80%	2.24%	2.28%	2.56%	2.69%	2.55%	2.56%	2.48%	2.34%	1.51%	1.43%		2.42%
Professional Touring Bike (red)		1.73%	2.02%	1.94%	2.42%	2.43%	2.39%	2.52%	2.50%	2.26%	1.92%	1.27%	1.40%		2.30%
Professional Touring Bike (silver)		4.83%	5.30%	5.00%	5.38%	5.43%	5.28%	4.78%	5.26%	5.03%	4.98%	4.55%	4.81%		5.18%
=ROB		14.07%	15.59%	15.96%	17.33%	17.69%	17.60%	18.03%	17.17%	17.62%	17.56%	14.09%	14.53%		17.20%
Deluxe Road Bike (Shimano)		7.38%	7.99%	7.39%	7.88%	7.81%	7.77%	8.47%	7.80%	8.35%	8.21%	7.41%	8.32%		7.92%
Deluxe Road Bike (SRAM)		1.42%	1.92%	2.28%	2.47%	2.61%	2.41%	2.22%	2.39%	2.42%	2.43%	1.82%	1.21%		2.35%
Professional Road Bike (Campagnolo)		0.32%	0.50%	0.69%	1.08%	1.04%	1.25%	1.08%	1.00%	0.83%	0.78%	0.18%	0.19%		0.97%
Professional Road Bike (Shimano)		4.80%	4.75%	4.80%	4.81%	5.19%	5.04%	5.23%	4.95%	5.15%	5.49%	4.44%	4.56%		5.02%
Professional Road Bike (SRAM)		0.16%	0.43%	0.80%	1.08%	1.05%	1.15%	1.03%	1.03%	0.86%	0.65%	0.23%	0.25%		0.95%
=EBI		0.24%	0.48%	0.52%	0.55%	0.51%	0.57%	0.43%	0.47%	0.65%	0.57%	0.36%	0.25%		0.51%
E-Bike Tailwind		0.00%	0.02%	0.05%	0.33%	0.37%	0.44%	0.23%	0.17%	0.13%	0.02%	0.00%	0.00%		0.26%
=TRE		0.00%	0.02%	0.05%	0.29%	0.30%	0.34%	0.21%	0.15%	0.12%	0.02%	0.00%	0.00%		0.21%
City Bike Max		0.00%	0.00%	0.00%	0.04%	0.06%	0.10%	0.02%	0.03%	0.01%	0.00%	0.00%	0.00%		0.04%
Fixed Gear Bike Plus		0.00%	0.00%	0.00%	0.04%	0.06%	0.10%	0.02%	0.03%	0.01%	0.00%	0.00%	0.00%		0.04%
Grand Total		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%		100.00%

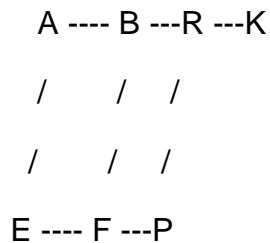
Question 4 : Bicycles and accessories are more likely to be bought in spring and summer as in fall and winter time. Find which product is an exception to this rule.

Answer 4 : ‘Air Pump and First Aid Kit’ are two products which have comparatively higher sales in fall and winter time.

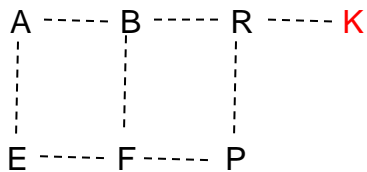
Part II. Data Structure (40 pts.)

In today's class, we reviewed the data structure called stack and queue, and learned about BFS and DFS.

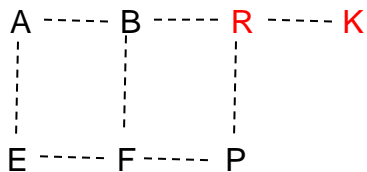
In the following graph, nodes are represented as alphabets.



- Please perform a Depth-First-Search (DFS) to find all paths from K to E. Please draw a tree to show your process. (20 points)
- K->R->B->A->P->F->E

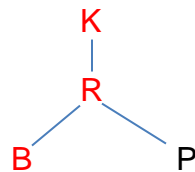
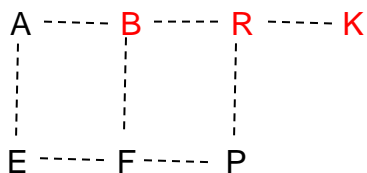


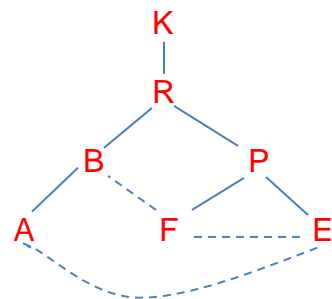
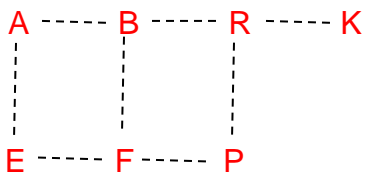
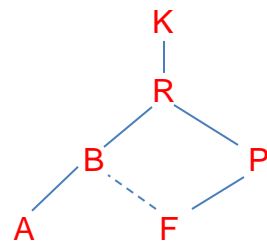
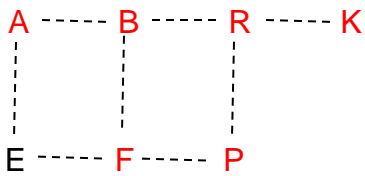
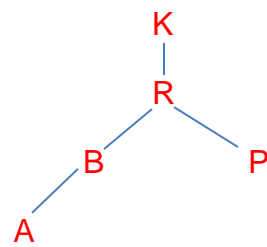
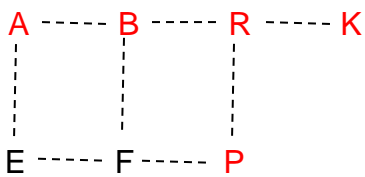
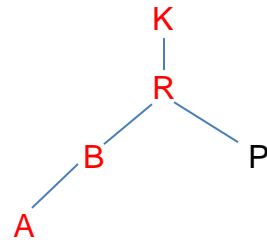
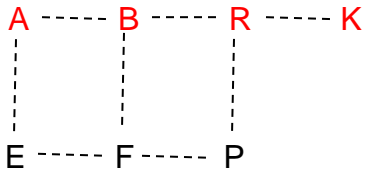
K



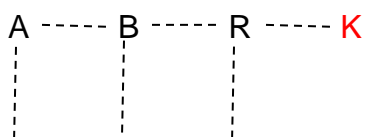
K

R



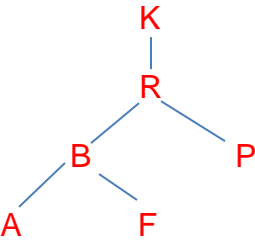
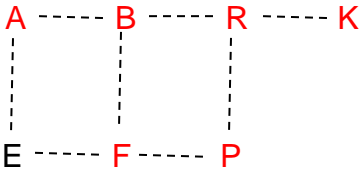
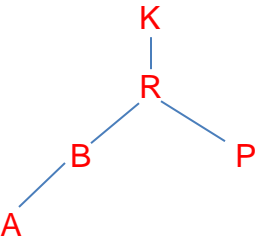
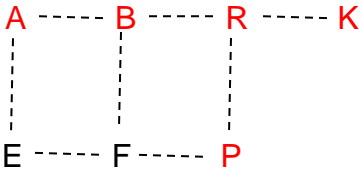
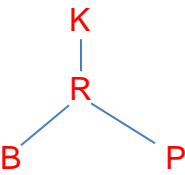
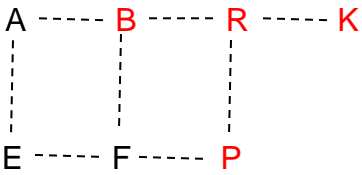
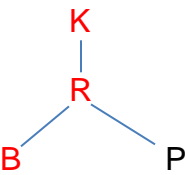
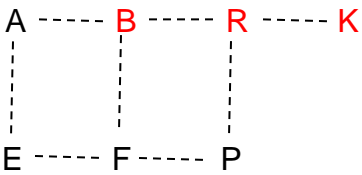
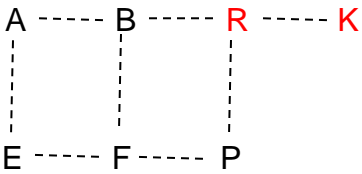


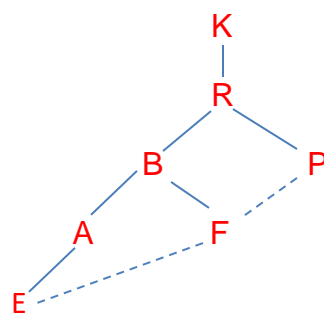
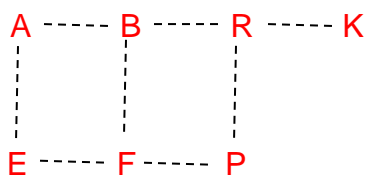
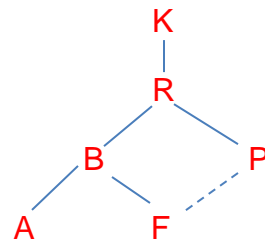
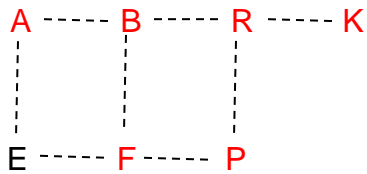
- Please perform a Breadth-First-Search (BFS) to find all paths from K to E. Please draw a tree to show your process. (20 points)



K

E ---- F ---- P





- K->R->B->P->A->F->E
- In BFS, Queue is used to traverse the vertices. It starts with the root node, the traverse through the child node i.e., level one and the traverse through the grandchild node, i.e., level two and so on , until reaches all the nodes

HINT: If logic alone does not help, you could pretend to be a “human stack” or “human queue”, follow the algorithm and pseudo code we covered in class and get the results.