Application Development Certification v10

Original release: June 2010

Contents

1. Introduction

1.1. About the Application Development Certification

The QlikView Application Development Certification is designed to evaluate a QlikView developer's knowledge of QlikView and BI concepts.

The certification is made up of the following components:

- A written test to judge developer knowledge of QlikView concepts.
- Delivery of a working QlikView document based on a provided dataset and business requirements.
- An interview with a QlikTech consultant to discuss the developed document.

1.2. Certification files

The following files are included in this certification:

`Application Development Certification Scenario.doc` - this document
`Validation Reports.xlsx` - data verification reports
`Certification.mdb` - certification database (Access)
`Certification.mdf` - certification database (SQL Server)
`Certification Data.xlsx` - additional certification data

Guides for Best Practices that will help in the Certification:

```
Design_and_Functionality_Best_Practices.pdf
QlikView_Optimisation_Best_Practices.pdf
The_QlikView_Data_Model_Best_Practices.pdf
DAR DEMO.qvw
```

2. Project Scenario

2.1. About BETSY'S BIKES

BETSY'S BIKES is an international reseller of biking products. They have been in business since 2000. Their sales are erratic but growing. They have a direct sales force though most sales come through the company website. Each salesperson and the website have a sales quota assigned. The company operates on a fiscal calendar with the year starting Jul 1 and ending Jun 30. The company is based in the U.S. and tracks revenue, costs, margin and quota in U.S. dollars and a local currency. All transactions are stored in U.S. dollars.

BETSY'S BIKES would like a business intelligence tool that provides analysis for sales, costs, margins, quotas and shipping statistics.

2.2. Dashboard, Analysis and Reporting

The users of QlikView documents often have different information needs. Management may only need or wish to have access to high level key performance indicators (KPIs). Another group of users need to perform more detailed analysis to examine the causes of the KPI results. A third group of users may depend on static reports to get the information their jobs demand.

To make QlikView a viable solution for all types of users, QlikTech has created the D.A.R (Dashboard, Analysis, Reporting) concept. An example of D.A.R is in the `DAR DEMO.qvw` document included in the certification material.

The D.A.R concept is meant to show QlikView as a solution that satisfies the information needs for all types of end-users. The `DAR DEMO.qvw` is provided as an example of the D.A.R concept. The candidate is not expected to duplicate the layout, nor even the functionality of the `DAR DEMO.qvw`. However, the candidate should submit a finished document that provides analysis to the various groups of users.

3. Requirements

3.1. Business Requirements

BETSY'S BIKES is looking for a business intelligence tool to provide analysis for their sales, cost, margin, quota and shipping statistics. The business intelligence tool should provide summary and detail analysis through an easy-to-use yet robust and flexible interface capable of handling multiple levels of user expertise and requirements. The business requirements are listed below.

Trends over Time

The company has provided 3 years of fiscal data. The document should allow the end-user to view data trended over time as well as the ability to compare selected time frames to the same time frames from the previous year(s).

Training

The final document should have a functional "How-To" section to show the end-user how QlikView works.

Dashboard

A dashboard showing the selected period information compared to the same period last year must exist. The date ranges to display are year-to-date, quarter-to-date and month-to-date.

The dashboard should also show the high-level sales, margin, actual vs. quota and on-time shipment percentage. All dashboard metrics should be calculated as if the current date is 30-JUN-2009.

Analysis and Reporting

End-users must be able to see the top or bottom sales results by all relevant dimensions (customer, products, salespeople, territories, vendors, etc.). End-users also need to see shipment statistics (number and on-time delivery %) by the relevant dimensions.

Point-In-Time Reporting

Related to Trending, the end-user should have the ability to pick any date and see the month-to-date, quarter-to-date and year-to-date information for that date compared to the same time periods for the previous year. The end-user should also have the ability to see information for the rolling twelve months ending on the date selected. This rolling twelve month period should be compared to the prior rolling twelve month period. For example, if the current date is 30-JUN-2009 the rolling twelve month periods are:

	Start	**End**
Current	1-Jul-08	30-Jun-09
Previous	1-Jul-07	30-Jun-08

The end-user should also have the ability to make various date selections and see information date in year over year or quarter over quarter comparisions.

Segment or Grouping Analysis

The end user should be able to look at shipment information based on days early or days late. The end-user should see the number of shipments made on time as well and the number of shipments that were late based on the number of days late. For example, the end-user should be able to see the number of shipments and associated sales for shipments that were early, on-time, 1-day late, 2-days late 3-days late and greater than 3-days late.

Screen Resolution

The standard screen resolution for BETSY'S BIKES is 1024 x 768. The user interface of the finished document must fit within the viewing area without the use of scroll bars or the need to apply a zoom setting to the document.

Metadata

In addition to comments in the QlikView script, the finished document must contain metadata about the tables, fields and expressions. This metadata must be visible to designers and users from various objects and Settings menus.

3.2. Business Problems

BETSY'S BIKES has a few items that must be resolved in the finished document. These items are described below.

Fiscal Calendar

The company operates on a fiscal calendar that starts Jul 1 and ends Jun 30. The fiscal periods correlate to calendar months. The company has provided three years of fiscal data that spans four calendar years. The finished document must make use of the fiscal calendar for trending and selections.

The table below describes how calendar periods relate to fiscal years and periods.

Calendar Period	Fiscal Year	Fiscal Period
7/1/2006	2007	1
8/1/2006	2007	2
9/1/2006	2007	3
10/1/2006	2007	4
11/1/2006	2007	5
12/1/2006	2007	6
1/1/2007	2007	7
2/1/2007	2007	8
3/1/2007	2007	9
4/1/2007	2007	10
5/1/2007	2007	11
6/1/2007	2007	12
7/1/2007	2008	1
8/1/2007	2008	2
9/1/2007	2008	3
Please note that this table is not complete		

Local Currency

BETSY'S BIKES is international company. All transactions are stored in U.S. dollars with a reference to the local currency code. The finished document should allow the end-user to view sales related metrics in USD and the local currency. BETSY's BIKES uses a standard exchange rate when budgeting. Please use the information below when converting the transactions into local currency.

Currency Code	Exchange Rate
AUD	1.0908
CAD	1.0187

EUR	0.7399
GBP	0.6650
USD	1.0000

Sales Territories / Salespeople

BETSY'S BIKES stores sales territory information in the Sales Order Header table. Sales territories are assigned to salespeople. This assignment changes over time and a record of these changes is stored in the Sales Territory History table. The relationship is known as a slowly changing dimension. The finished document must successfully incorporate this slowly changing dimension to correctly present sales metrics by salesperson.

Website Sales

Sales transactions, whether online (Website) or direct (salesperson), have a sales territory. As mentioned above salespeople are related to sales territories. In the case of online sales the finished document should not show the salesperson associated with the territory. Instead, the finished document must show the transaction as a Website sale. As the QlikView developer, you must override the salesperson for all online sales. Online sales are determined by a flag in the Sales Order Header table.

Salespeople

The finished document must show a hierarchical view of salespeople. This includes the online sales. Online sales have no direct report. Online sales do "report to" salesperson 285, Syed E. Abbas. This relationship must be shown in the salesperson hierarchy.

On-Time Shipment Percentage

BETSY'S BIKES has a company metric of 97% on-time shipping. All shipments that occur on or before the due date are considered on-time. The company noticed a problem with certain shipments in the first Fiscal Quarter of 2009. The end-user must be able to find this anomaly in the finished document. There are also other occurrences of less than 97% on-time shipping. The end-user should be able to find these also.

Sales Quota

BETSY'S BIKES stores sales quota information in an Excel spreadsheet. The quota information is stored at a different level of detail than the actual sales transactions.

Sales quota is stored by Salesperson and Quarter. Sales transactions are stored Daily. Online sales also has a quota stored in the same table. As the QlikView developer, you must successfully resolve this 'level of detail' problem.

Freight and Tax

Freight and tax information is stored in the Sales Order Header table. The end-user must be able to analyze this data by the relevant dimensions (customer, product, territory, etc.).

Vendors

BETSY'S BIKES can have multiple active vendors for their purchased products. The vendor information is stored in Vendor and Product Vendor tables. The finished application requires the preferred, active vendors. All other vendors may be ignored. BETSY'S BIKES also manufactures many items. These items may not have a record in the Product Vendor table.

As the QlikView developer you will need to resolve this problem in the finished application.

Bill-To / Ship-To Addresses

Each sales transaction has a single customer, however the transaction may have different billing and shipping addresses. This information must be available in the finished document though it can be informational only. There should be at least one screen object that makes use of this information.

3.3. User Interface Requirements

The user interface is 50% of the final score for the certification. As the QlikView developer you should be very familiar with the materials found at http://www.qlikview.com. You should also spend time looking at the demos at http://demo.qlikview.com for ideas on how to present information using QlikView.

Since the majority of QlikView users will access their applications via the internet using AJAX (zero footprint), the completed user interface will be graded based on its appearance when viewed on the web. Although the rendering of sheet objects using the desktop developer version of QlikView should agree with the web version, it is a good idea to review the results in WebView mode for final validation.

Other requirements are described below.

Executive / Management / Dashboard View

The finished application should provide a quick glance at the company's performance. This should be a high-level view with few, if any selections. The management team at BETSY'S BIKES wants to see year over year business performance and does not want to make selections to do this. The metrics to be included are Sales (versus the previous year's sales and versus Quota), Margin % and On-Time shipments. The variance from the previous year Sales and current year Quota must also be displayed. The rolling 12 months sales should be displayed as well.

This must be on a single sheet in the finished document. The year over year analysis must include year-to-date and quarter-to-date metrics.

KPI View (Key Performance Indicators)

The company is looking for more detail on the following metrics:

- Sales by Salesperson
- Delayed Shipments as a % of total shipped
- Delayed Shipments by the number of days delayed segmented by day. See "Shipment Segments / Grouping / Buckets" below for more information.
- Average Sales by Salesperson
- Sales vs. Quota
- Average Order Cost by Salesperson

Ideally, this information should all be available on a single sheet in the finished document.

At a minimum, the end-user should to be able to make selections on the Year, Quarter, Month, Territory Group, State-Province Code and Customer Type. There must also be a Tree View list box with the sales organization. BETSY'S BIKES would like more selection possibilities to be included, but only if the layout of the document stays uncluttered.

Detailed Analysis

The rest of the finished document should provide the ability to investigate detailed information. These requirements are listed below. On all these views the end-user must be able to make selections on the Year, Quarter, Month, Territory Group, State-Province Code and Customer Type. There must also be a Tree View list box with the sales organization. BETSY's BIKES would like more selection possibilities to be included, but only if the layout of the document stays uncluttered.

Sales

The finished document should have the ability to Cycle through 3 sets of charts on the same page. These charts should show the following information:

- Sales vs. Quota
- Sales by Model Name by Sales Person on a chart that shows Percentage of Sales by Sales Person within each Model Name. (Mekko Chart)
- Quarter over quarter Sales on a rolling 3 quarter period and within a period regardless of a calendar selection i.e. selecting the 2nd month in Q1 will compare the 2nd month in the preceding quarters.
- Company special metrics for both Sales and Quantity by Salesperson and the ability to filter on other dimensions. The definitions for these special metrics are in section 3.4 in this document.
- Sales trends (all are Fiscal calendar based)
    - Year over year comparisons
    - Fiscal period
    - Calendar based drill-downs

Territory

For Territories, BETSY'S BIKES is interested in the growth of sales trended over time. They also want to start at a high level and navigate down to other levels. It is also important to see what type Customer is buying as well. Specific requirements are:

- The company wants to see Sales for all Territories across all years with the ability to drill into quarters and months in the same chart(s). Ideally the chart will be segmented by Territory
- Year over year Sales by Customer Type

Purchasing

The company needs a view into Vendors and the items being purchased from those vendors. The important metrics are Sales Quantities and Margin (amount and percent).

Shipping

BETSY'S BIKES requires the ability to examine shipment details. They want to analyse the metrics: On Time Shipping and Shipment Segments/Grouping/Buckets in detail.

In particular they are interested in identifying the reason for the problems they had with the on time shipping percentage mentioned in "On-Time Shipment Percentage" section of this document.

Invoices

Detailed information is needed to lookup an Order. BETSY'S BIKES will use this information to insure accuracy of information and also to answer customer questions. The information on this should include the following:

- Customer Contact
- Customer ID
- OrderID
- Salesperson Name
- Product
- Local Currency
- USD Amount
- Quantity
- Freight

In this view the end user must be able to search for and select values in all the fields listed above as well as the fields listed at the top of this (the Detailed Analysis) section.

3.4. Key Measurements

BETSY'S BIKES requires the following metrics to be included in the finished document. Ideally these measurements will indicate compliance with business goals through an overall "dashboard" view, as well as detailed comparisons. These comparisons should have the ability to be trended over time.

Sales

Sales is defined as the Order Quantity * Unit Price - Discounts. Discounts are stored on the transaction as a discount percentage. The fields involved in this metric are: **OrderQty**, **UnitPrice** and **UnitPriceDiscount**.

Costs

Cost is defined as the Product Standard Cost * Order Quantity. This is also known as cost of goods sold. The Product Standard Cost is stored in the Product table. The fields involved in this metric are: **OrderQty** and **StandardCost**.

Margin

Margin is defined as Sales – Cost. This is also known as gross margin. The fields involved in this metric are: **OrderQty**, **UnitPrice**, **UnitPriceDiscount** and **StandardCost**.

Margin %

Margin % is defined as Margin / Sales for any given selection. This is also known as gross margin %. The fields involved in this metric are: **OrderQty**, **UnitPrice**, **UnitPriceDiscount** and **StandardCost**.

Variance %

Variance % is defined as:

(Actual Value – Comparison Value) / Comparision Value or
Actual Value / Comparison Value – 1.

The calculations for Sales vs. Quota variance are:

(Sales – Quota) / Quota
Sales / Quota - 1

On Time Shipping

BETSY'S BIKES has an internal metric of 97% on-time shipping.
On-Time shipping is defined below:

On-Time:	Shipment Date – Due Date <= 0
Late:	Shipment Date – Due Date > 0

On-Time Shipping % is defined as:

Count of On-Time Shipments / Count of All Shipments

The fields involved in this metric are: **DueDate** and **ShipDate**.

On-Time Shipping is very significant metric for Betsy's Bikes. As a quick reference, the company would like to see the calculated On-Time percentage included in any selection list of its stores.

Shipment Segments / Grouping / Buckets

This is defined by the On-Time shipment metric above. BETSY'S BIKES wants to see the number of shipments that fall into specific days late groups.

When displayed on the screen the groups must be in this order:

1. On-Time
2. 1 day late
3. 2 days late
4. 3 days late
5. > 3 days late

The fields involved in this metric are: **DueDate** and **ShipDate**.

Special metrics

BETSY'S BIKES has two special metrics: SalesComp and QuantityComp. The definitions of these metrics are:

- SalesComp - average of the average Sales Amount by Order and Salesperson.
- QuantityComp - average of average Sales Quantity by Order and Salesperson.

Given the table of data below:

Salesperson	Sales Order	Order Quantity	Order Total	Items / Order	Avg. Order Qty	Avg. Order Sales
Blythe, Michael G.	45053	29	$19,315	17	1.71	$1,136.18
Blythe, Michael G.	45063	20	$11,121	8	2.50	$1,390.15
Blythe, Michael G.	45067	9	$3,092	6	1.50	$515.31
Blythe, Michael G.	45069	26	$24,552	14	1.86	$1,753.72
Blythe, Michael G.	45271	11	$5,980	5	2.20	$1,196.01
Mitchell, Linda C.	45040	1	$419	1	1.00	$419.46
Mitchell, Linda C.	45044	8	$5,057	6	1.33	$842.79
Mitchell, Linda C.	45046	2	$839	2	1.00	$419.46
Mitchell, Linda C.	45059	32	$31,282	17	1.88	$1,840.15
Mitchell, Linda C.	45060	32	$23,946	19	1.68	$1,260.34
Carson, Jillian .	45045	9	$14,261	6	1.50	$2,376.89
Carson, Jillian .	45048	7	$6,128	4	1.75	$1,531.95

Carson, Jillian .	45051	5	$3,008	3	1.67	$1,002.65
Carson, Jillian .	45055	27	$19,743	17	1.59	$1,161.34
Carson, Jillian .	45071	11	$5,980	5	2.20	$1,196.01
Reiter, Tsvi Michael.	45056	27	$38,655	9	3.00	$4,295.05
Reiter, Tsvi Michael.	45061	44	$73,261	11	4.00	$6,660.10
Reiter, Tsvi Michael.	45062	37	$15,843	20	1.85	$792.13
Reiter, Tsvi Michael.	45065	28	$24,025	15	1.87	$1,601.67
Reiter, Tsvi Michael.	45066	1	$419	1	1.00	$419.46

The SalesComp and QuantityComp metrics are:

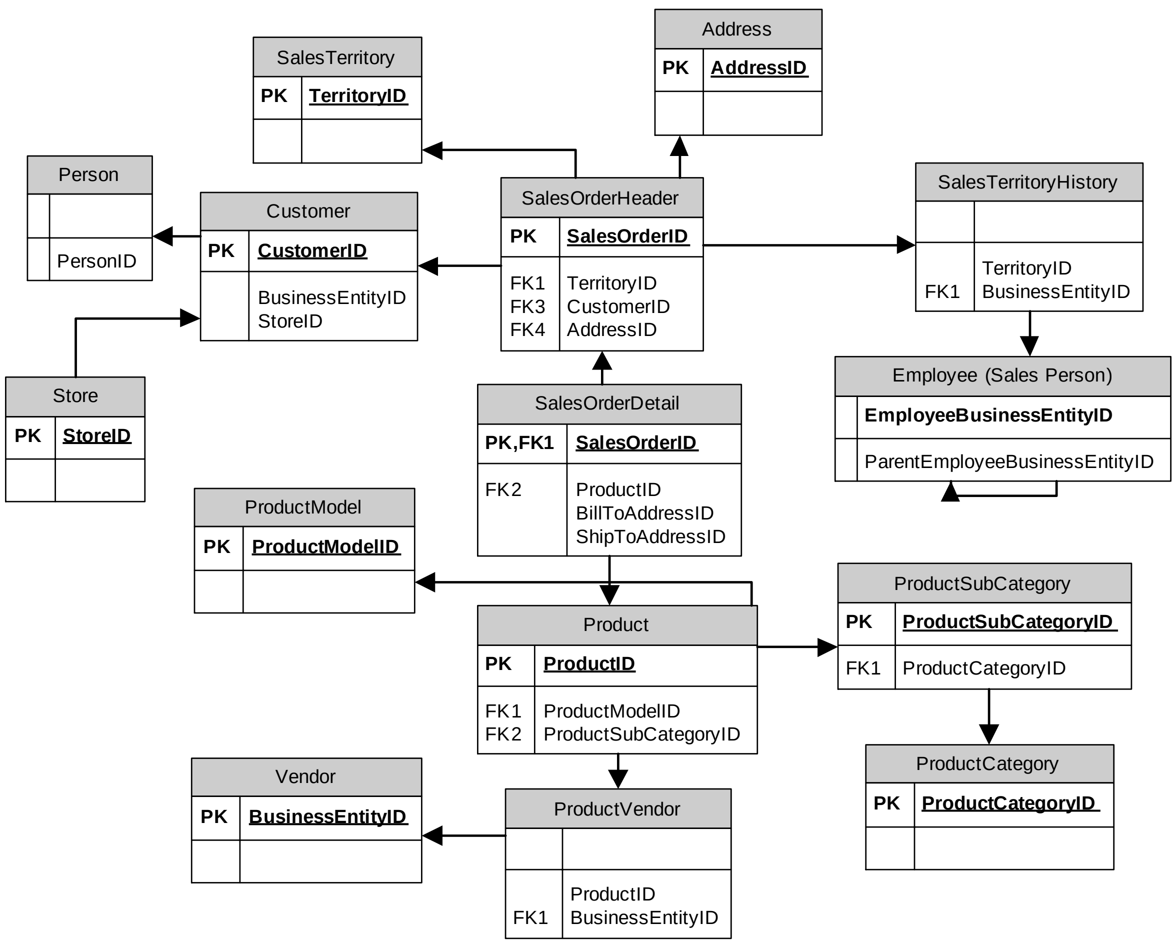
	QuantityComp.	**SalesComp.**
Blythe, Michael G.	1.95	$1,198.27
Mitchell, Linda C.	1.81	$1,054.93
Carson, Jillian .	1.58	$945.46
Reiter, Tsvi Michael.	1.48	$926.29
	1.85	**$1,590.54**

This example is included in the Certification Data.xlsx workbook. The example is from the certification data and contains the actual calculations for the special metrics.

4. Data Sources

4.1. Certification.mdb

This is the primary data source for this document. The database diagram is below.



Address

The Address table contains both the Bill-To address and the Ship-To addresses. They are linked to the SalesOrderHeader table based on the AddressID from this table. The finished document should contain only the address associated with sales transactions.

Customer

This table contains information about the Customer. This links back to the SalesOrderHeader based on the CustomerID in both tables. This table also identifies the territory that the customer belongs to. The territory in this table should not be confused with the territory in the sales transactions. The territory in the sales transactions is used to assign salespeople. The territory in the customer table should be used to determine the territory and regional dimensions that are displayed in the user interface.

This table also contains the Customer contact (PersonID). This table includes the entire Customer List. The finished document should only contain the customers that have sales transactions.

Employee

This table contains dimension data. The EmployeeBusinessEntityID is linked to the BusinessEntityID from the SalesTerritoryHistory table. Salespeople have a BusinessEntityID greater than 273. This will never change.

The table links back to itself using the EmployeeBusinessEntityID and the ParentEmployeeBusinessEntitiyID. The ParentEmployeeBusinessEntityID is the direct report for an employee. A ParentEmployeeBusinessEntityID will also have a record there it is the EmployeeBusinessEntityID. This information can be used to create a hierarchical view of salespeople.

Person

This table contains the contact information that is linked to a customer. The BusinessEntityID is associated to the PersonID found in the Customer table.

Product

The Products table is linked to SalesOrderDetails by the ProductID. Cost of goods sold can be calculated using the StandardCost from this table. The Product Model Name can be found in the ProductModel table using the ProductModelID. The ProductSubCategoryID is related to the same key name in the ProductSubCategory table. This is the entire list of products. The finished document should only contain the products included in sales transactions.

ProductCategory

This table contains Product category information and is linked to the ProductSubCategory table using the ProductCategoryID found in both tables.

ProductModel

Use this table to get the Product name. The finished document should only contain Product information for Products included in sales transactions.

ProductSubCategory

This table provides the Product Sub Category name.

ProductVendor

This table has a list of Vendor ID's and the ProductID. The Vendor ID is called the BusinessEntityID.

SalesOrderDetail

This table contains transaction data related to Order Lines. It is directly related to SalesOrderHeader via SalesOrderID. This table also includes information on when a Product shipped and when it was due to ship. Revenue, Special Offers and Discounts are found here.

SalesOrderHeader

This table contains transaction data related to SalesOrderDetail. It is directly related to Customers, Shipments, Local Currency, Territory and Freight information.

SalesTerritory

This table contains dimension data related to Countries and Sales Territory. There is a foreign key relationship to many of the other tables in the database. There is a direct relationship to the SalesOrderHeader table.

SalesTerritoryHistory

This table contains dimension data. Salespeople are associated to sales based on the TerritoryID and the OrderDate. The Salesperson ID is the BusinessEntityID in this table. This table does not have an end date in all cases so one must be provided in order to make use of this slowly changing dimension.

Store

This is the list of Stores with the store name. The SalesPersonID in this table should be ignored.

Vendor

The Vendor ID is the BusinessEntityID in this table. This table should be used to identify a vendor's active and preferred status. A zero is an indication that the vendor is not active nor preferred. The finished document should contain only the active and/or preferred vendors.

4.2. Certification Data.xlsx

This contains information that is not in the `Certification.mdb`. Two spreadsheets need to be incorporated; Quota and Special Offer.

The Special Metrics example also resides in this file

4.3. Shipping Method

There are 2 shipping methods.

1 - Ground
5 - Cargo Transit

The finished document must include this information.

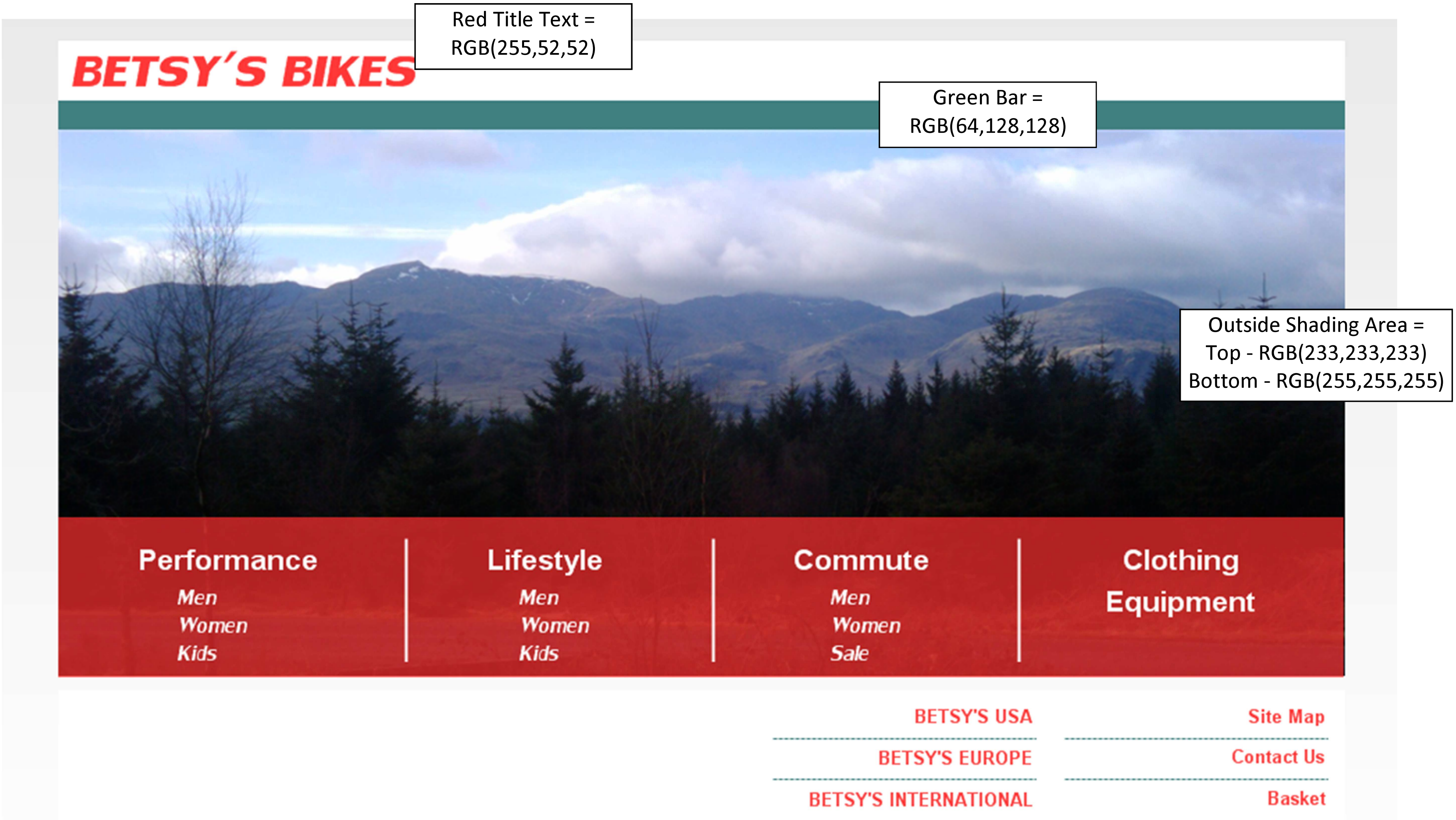
4.4. Validation Reports.xlsx

This file contains example reports currently used by BETSY'S BIKES. It is important to note that the dates in the reports are calendar and not fiscal. Please be sure to read the notes in the reports regarding selections and dates.

4.5. BETSY'S BIKES website.

BETSY'S BIKES has a website that should be utilized for font, color and navigation concepts for the submitted document. A screen shot of the website can be found below.

Note: The BETSY'S BIKES website does not actually exist.



Red Title Text = RGB(255,52,52)
BETSY'S BIKES
Green Bar = RGB(64,128,128)
Outside Shading Area = Top - RGB(233,233,233) Bottom - RGB(255,255,255)
Performance
Men
Women
Kids
Lifestyle
Men
Women
Kids
Commute
Men
Women
Sale
Clothing Equipment
BETSY'S USA
BETSY'S EUROPE
BETSY'S INTERNATIONAL
Site Map
Contact Us
Basket

5. Evaluation Criteria

The following is a description of the criteria that the censor will use in evaluating the finished document.

5.1. General

It is expected that the candidate will meet these general criteria:

- Results correspond to the reports provided.
- Satisfy the business requirements described within this document.
- Provide the information specified in within this document.
- Use of the BETSY'S BIKES website colors.

5.2. Data Model and Script

It is expected that the student will meet these criteria:

- Eliminate synthetic keys where possible
- One table containing the master calendar
- Group the script into different tabs
- Use of comment in the script
- Good use of variables in the script
- Perform as many calculations as possible in the script instead of in the objects
- No circular references. The document will automatically fail if there is a circular reference.
- No loosely coupled tables. The document will automatically fail if there is a loosely coupled table.
- All scripting work must be included in the document. It is OK to make use of .QVD and other intermediate files, however the creation of these files must be included in the load script. The document will automatically fail if all the script used to achieve the final data model is not shown.
- All data manipulation will be done using QlikView load script and internal functions. The student will not receive points for data manipulation done using other tools, i.e. SQL, Excel spreadsheets, etc.

It is recommended to read through the '*QlikView Data Modeling Best Practices*' document included with the certification material. The file is named: `The_QlikView_Data_Model_Best_Practices.pdf`.

5.3. Layout and Presentation

It is expected that the candidate will meet these criteria:

- Clean, consistent layout conforming to the QlikView best practices.
- The layout must conform to the company BETSY'S BIKES's online presence (use the colors and fonts from the web page)
- When a sheet or object is activated the object(s) must finish calculating within two seconds.
- The user interface should be designed for users with 1024x768 screen resolution
- Comments describing the purpose or functionality of Expressions and Variables should be provided.
- Use of container and linked objects where appropriate. This normally includes, but is not limited to, the following object types: Search, Current Selections, List Box, Multi Box

A good layout is one that is consistent with the Aesthetics and Usability & Design Pointers chapters in the Design and Functionality Best Practices. The file name of this document is: `Design_and_Functionality_Best_Practices.pdf`.

5.4. Other Criteria

Here is a list of items that must be included within the finished document.

- The information is not related to the current date, make sure that you use a variable to set the current date to 30-Jun-2009.
- All calendars are Fiscal and should represent Jul 1 as the first of the year.
- When displaying months, July should be first in the list.
- Appropriate use of as many of the QlikView screen objects as possible.
- You must use Set Analysis, Aggr(), Actions, Minicharts, Trellis charts, Mekko charts, Tree View List Box, Container Objects, Linked Objects and Associative Search at least once within the final document.
- The customer would like to see its logo imbedded within a common sheet object (such as a Current Selections object) so that it will not take up unnecessary room on the sheet.
- You are expected to create your own metadata for loading into the final document. This metadata source (Excel, text file, etc.) must be submitted with the final document.