

BCS Digital Industries Apprenticeship Synoptic Project

Data Analyst – Management Information Reporting

**Version 1.3
November 2018**

Change History

Any changes made to the project shall be clearly documented with a change history log. This shall include the latest version number, date of the amendment and changes made. The purpose is to identify quickly what changes have been made.

Version Number and Date	Changes Made
V1.0 August 2017	Document created
V1.1 August 2017	Minor change to project objectives
V1.2 July 2018	Submission email address amended
V1.3 November 2018	Declaration template removed. To be supplied in a separate document.

Project Overview and Objectives

You are the Data Analyst for Matrix Manufacturing and Retail. Your role is pivotal in both performance reporting and analysis, as well as lending insight and direction to possible business decisions. The company sells in excess of 100 products across various departments and provides delivery nationwide. Your manager has an important meeting with senior executives in one week's time to discuss business performance.

As the data analyst, your manager has requested that you produce a report showing the following:

- 1. how sales on the bike product category are performing by region.**
- 2. profitability year on year.**
- 3. profitability this year against last year's figures.**
- 4. a breakdown by product subcategory.**
- 5. you are also expected to advise on any issues you feel may face the organisation based on your report.**

Project Outputs and Deliverables

Once completed, to demonstrate completion of the tasks you will be asked to provide a series of outputs, that should be submitted along with the synoptic project declaration.

Deliverable	Output	Evidence
Structuring the problem and work planning	<ul style="list-style-type: none"> A written understanding of the task. A project plan for the duration of the Synoptic Project. Update the actual time spent against the plan. 	Word document and Excel spreadsheet or other Project Management tool.
Engaging the customer	<ul style="list-style-type: none"> A documented representation of requirements gathering, reflecting the approach that may have been taken to obtain the customers desired report outputs. 	Word and/or Excel spreadsheet to show minutes / activity logs.
Data gathering	<ul style="list-style-type: none"> Written 'select' statements used to extract relevant data tables from MS SQL – Adventure Works 2014 Sample Database, export to excel for analysis. 	Word document containing sample SQL queries. Data tables in Excel spreadsheet.
Conducting analysis	<ul style="list-style-type: none"> Data mining, time series forecasting and data modelling to identify trends and patterns. 	Excel spreadsheet to show formulas, analysis and charts generated.
Developing insight and making recommendations	<ul style="list-style-type: none"> Translating analyses into insight, extracting the "so what" of each analysis/piece of information from the charts and tables. 	Word document or Excel file of relevant charts and tables.
Communicating recommendation	<ul style="list-style-type: none"> Using the generated charts and tables to provide arguments to underpin the case to be made to senior executives. 	Delivering a report using PowerPoint presentation.

Project Information and Equipment

To complete this project, you will need to review all the information specified in this document, this will enable you to deliver the key outputs and deliverables for this project detailed in the table above.

In addition, your training provider and / or employer will provide you with all resources required to complete your project including:

- Laptop / PC with current version of Microsoft SQL, with Adventure Works 2014 Sample Database attached;
- Microsoft Excel, Word and PowerPoint;
- Internet access to enable you to perform any research.

Competencies and Knowledge Standards

Below is a list of competencies and knowledge standards covered by this project.

Knowledge Standards

- Understand and can apply industry standard tools and methods for data analysis
- Understand the project life cycle
- Understand the importance of clearly defining customer requirements for data analysis
- Understand the steps involved in carrying out routine data analysis tasks
- Understand the organisation's data architecture

Competency Standards

- Identify, collect and migrate data to / from a range of internal and external systems
- Manipulate and link different data sets as required
- Perform database queries across multiple tables to extract data for analysis
- Perform routine statistical analysis and adhoc queries
- Use a range of analytical techniques such as data mining, time series forecasting and modelling techniques to identify and predict trends and patterns in data
- Apply the tools and techniques for data analysis, data visualisation and presentation
- Summarise and Present the results of data analysis to a range of stakeholders making recommendations

Appendix A – Background Information

- The overall aim of this project is to develop a report that can determine the overall performance of the company. This report will bring together data from a core set of performance indicators, into a single analysis.
- The organisation has recently experienced a decline in its profit margin, despite a huge increase to their marketing budget. The boards aim is to understand the root cause of this decline and make an informed decision around their future spend on marketing campaigns.
- The business has been witnessing a quarterly 20% sales increase, which enabled them to introduce new products every other month.
- The incremental pattern in sales and expansion has declined drastically over recent months and the board believe that by identifying the products generating fewer sales, would allow for a marketing programme to be developed leading to an increase in sales.
- This initial piece of work will lead to a more detailed application of data analytics across specific business areas and / or to the implementation of targeted marketing actions and new product development.
- This report will help to encourage the board that intelligent and creative use of data analysis can give the organisation an advantage. It will also help them to understand the marketing strategy for each product, whilst considering the time of year at which sales are highest.
- Your manager would like to understand the relationships between customer purchases, product categories and revenue, to enable more sales, an increase in revenue per sale and to improve the quantity of products purchased per sale.
- They want to understand the role that the time of year plays to a customer, as this insight would likely improve sales significantly.
- The key challenge facing the board is that decisions will need to be made regarding upcoming, coinciding marketing campaigns and if these should be postponed temporarily or permanently.

Appendix B –Business Requirements

- This project requires the correct data tables be extracted from the database (Adventure Works 2014 Sample Database) and then be exported to excel, allowing you perform analysis indicating margin, revenue, cost of sales and trend analysis.
- It is intended that the report will:
 - Provide both a summary of current performance and trends.
 - Directly feed, as far as possible, various performance indicators (margin, revenue and cost of sales) across weekly, monthly and quarterly breakdowns.
 - Be a 'live' report that can be updated as and when new data becomes available, representing real-time performance levels.
- This project covers the design and development of a basic version of this report – a second phase of development is anticipated.

Appendix C - Key features and overall design

The report should provide three main views of the data

1. A tabular summary of indicators (ideally on a single page) that show a time series of performance and indicates variance. This summary will be available at the following granular levels:
 - Overall performance;
 - Regional.
2. A tabular view of the data that allows the management to see the performance of all products at Category and Subcategory level.
3. A graphical summary of performance at monthly, quarterly and annual levels.

The report should also:

- Indicate which period the latest data covers
- Allow users to easily copy content for other meeting purposes
- Provide a brief description of each metric included

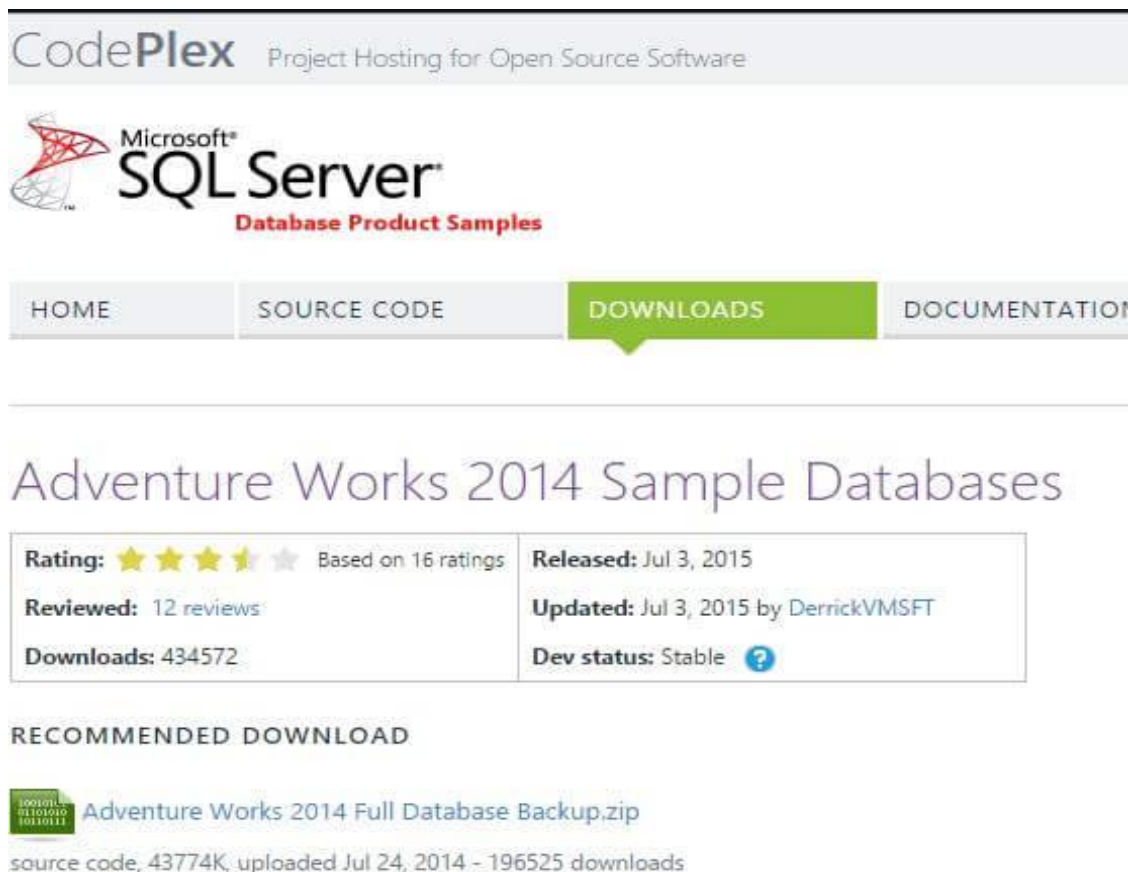
Appendix D - How to Attach Sample Database – Adventureworks 2014 in SQL Server

Please note - This task is to be completed by the training Provider in advance of the commencement of the Synoptic Project.

The sample database AdventureWorks plays an important role while performing test operations and learning about SQL databases and new features. Microsoft provides a backup of the AdventureWorks2014 database on its CodePlex website. The 2014 version of the AdventureWorks databases can be found at the following link:

<https://msftdbprodsamples.codeplex.com/releases/view/125550>

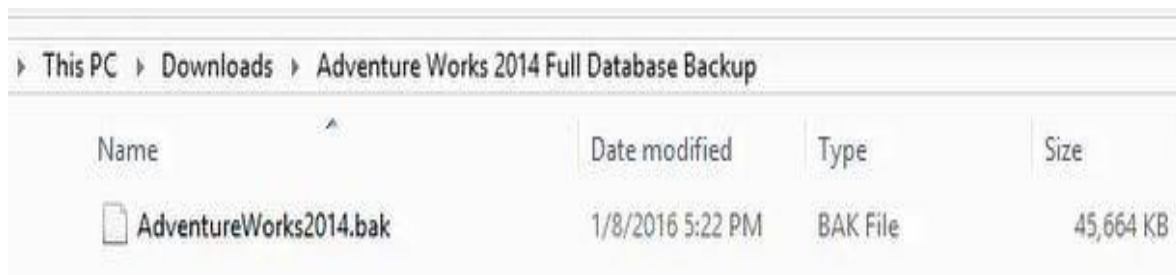
There are multiple zip files on this web page for both the OLTP AdventureWorks2014 database and the dimensional model for data warehousing named AdventureWorksDW2014.




The screenshot shows the CodePlex website interface. At the top, the CodePlex logo and tagline "Project Hosting for Open Source Software" are visible. Below this is the Microsoft SQL Server logo with the text "Database Product Samples". A navigation bar contains links for HOME, SOURCE CODE, DOWNLOADS (which is highlighted), and DOCUMENTATION. The main heading is "Adventure Works 2014 Sample Databases". Below the heading is a box containing project details: Rating (4 stars, based on 16 ratings), Reviewed (12 reviews), Downloads (434572), Released (Jul 3, 2015), Updated (Jul 3, 2015 by DerrickVMSFT), and Dev status (Stable). Below this box is a section titled "RECOMMENDED DOWNLOAD" which lists the file "Adventure Works 2014 Full Database Backup.zip" with a source code size of 43774K, an upload date of Jul 24, 2014, and 196525 downloads.

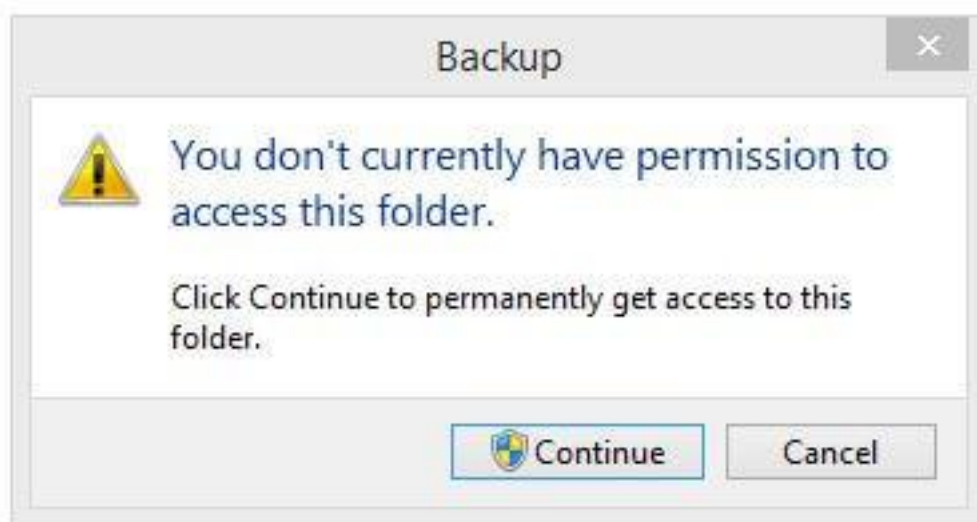
In this tip, we will download the Adventure Works 2014 Full Database Backup.zip file as shown above. Unless you have changed your browser's settings, the zip file will download to your Downloads folder.

Once the download has finished, you must extract the contents of the zip file. The zip file contains a single SQL Server backup file with a .bak extension named AdventureWorks2014.bak.

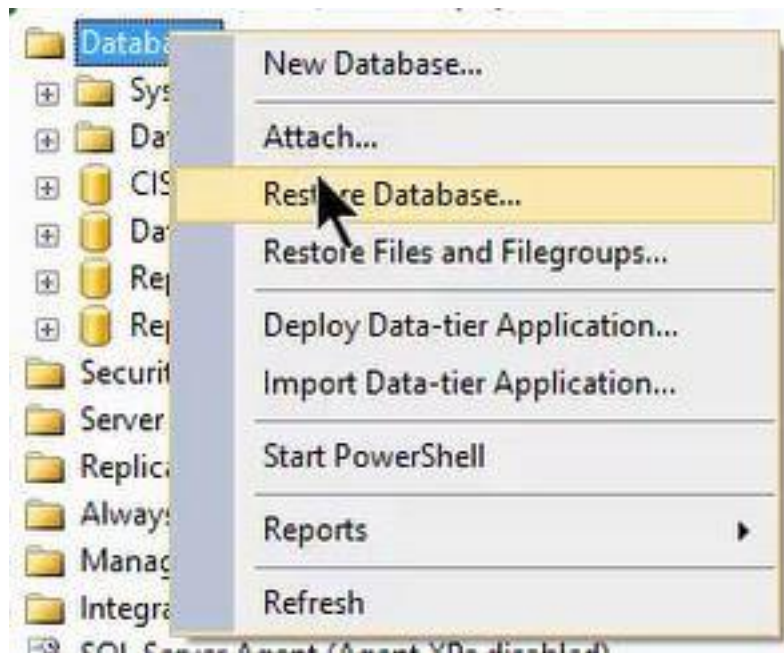


Name	Date modified	Type	Size
 AdventureWorks2014.bak	1/8/2016 5:22 PM	BAK File	45,664 KB

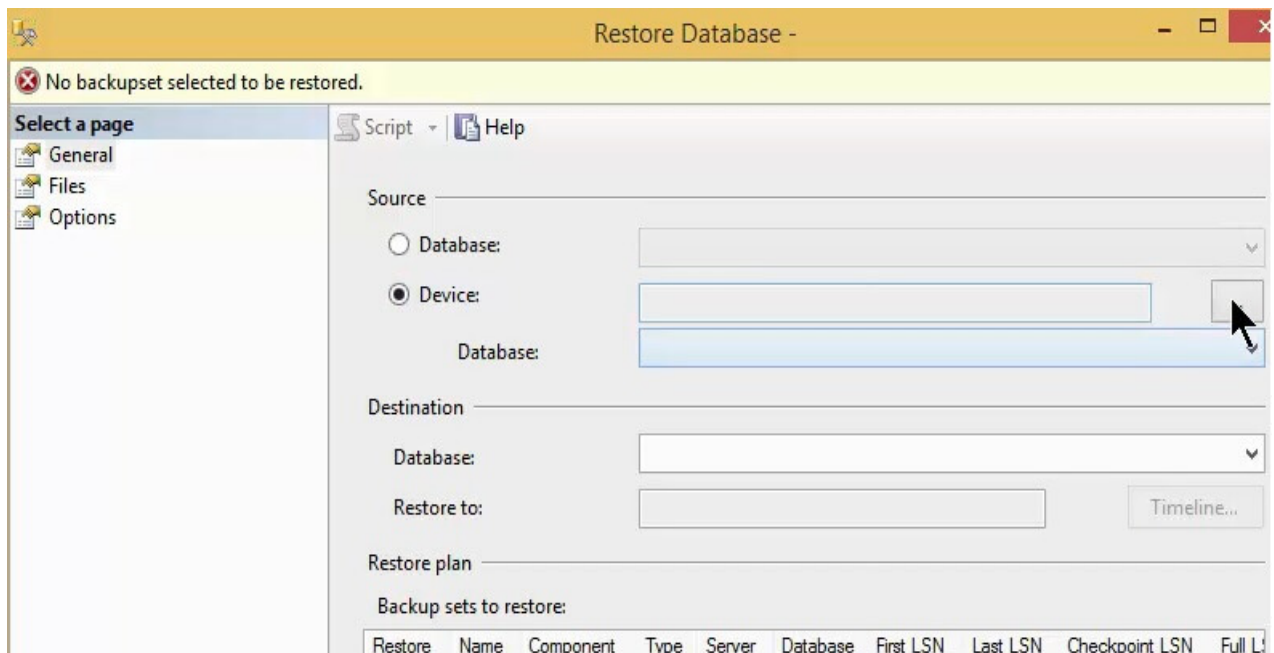
After extracting the file, copy the file to your database instance's Backup folder. You might get the following pop-up message, since I am the administrator on my own PC, I clicked on Continue.



In SQL Server Management Studio (SSMS), right-click on "Databases" and choose "Restore Database..." to bring up the Restore Database window.



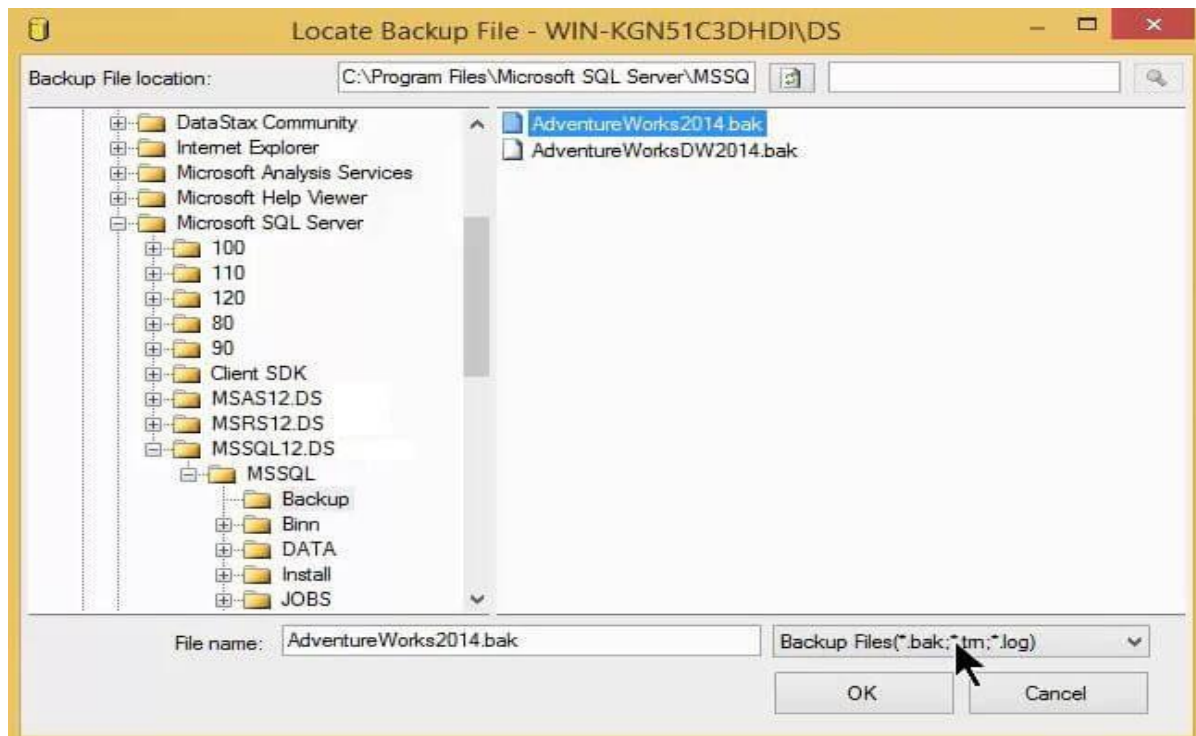
In the Restore Database window, we must specify the AdventureWorks2014.bak file that we have extracted and moved into the database instance's Backup folder. In the Source groupbox, click on the Device radio button and then click on the ellipsis to the right as shown below.



In the Select backup devices window, the Backup media type is File. We need to click on the Add button.



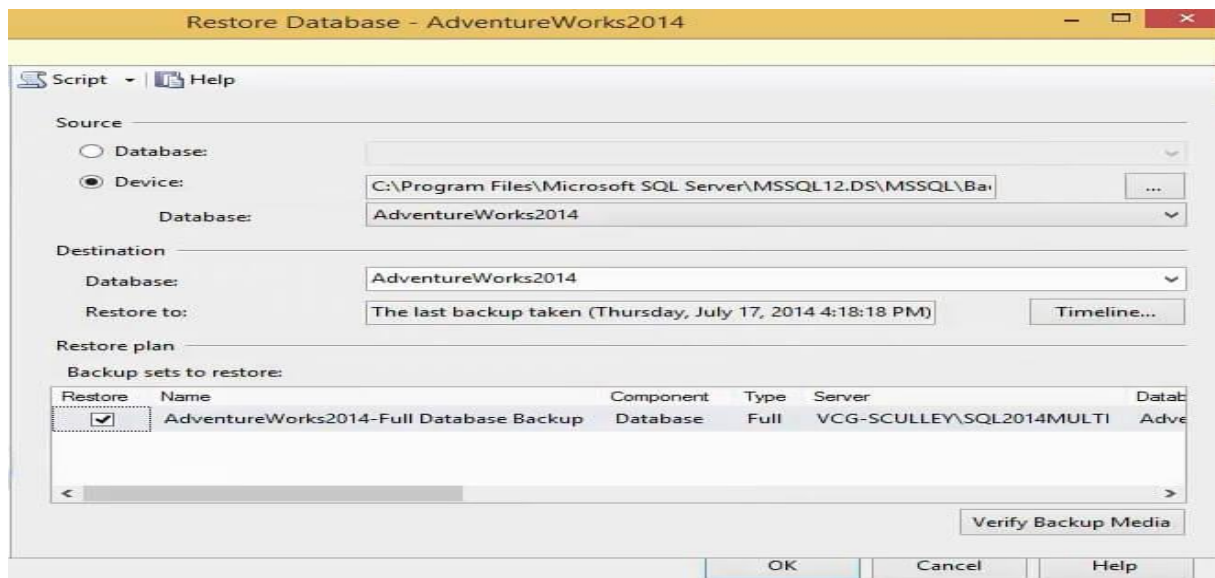
In the Locate Backup File window, navigate to your database instance's Backup folder. Select the appropriate backup file. As shown here AdventureWorks2014.bak and AdventureWorksDW2014.bak reside in the Backup folder. Click on AdventureWorks2014.bak and then click on OK. This will return you to the Select backup devices window.



In the Select backup devices window, the path and filename to AdventureWorks2014.bak should now appear. Click on OK to close the Select backup devices window and return to the Restore Database window.



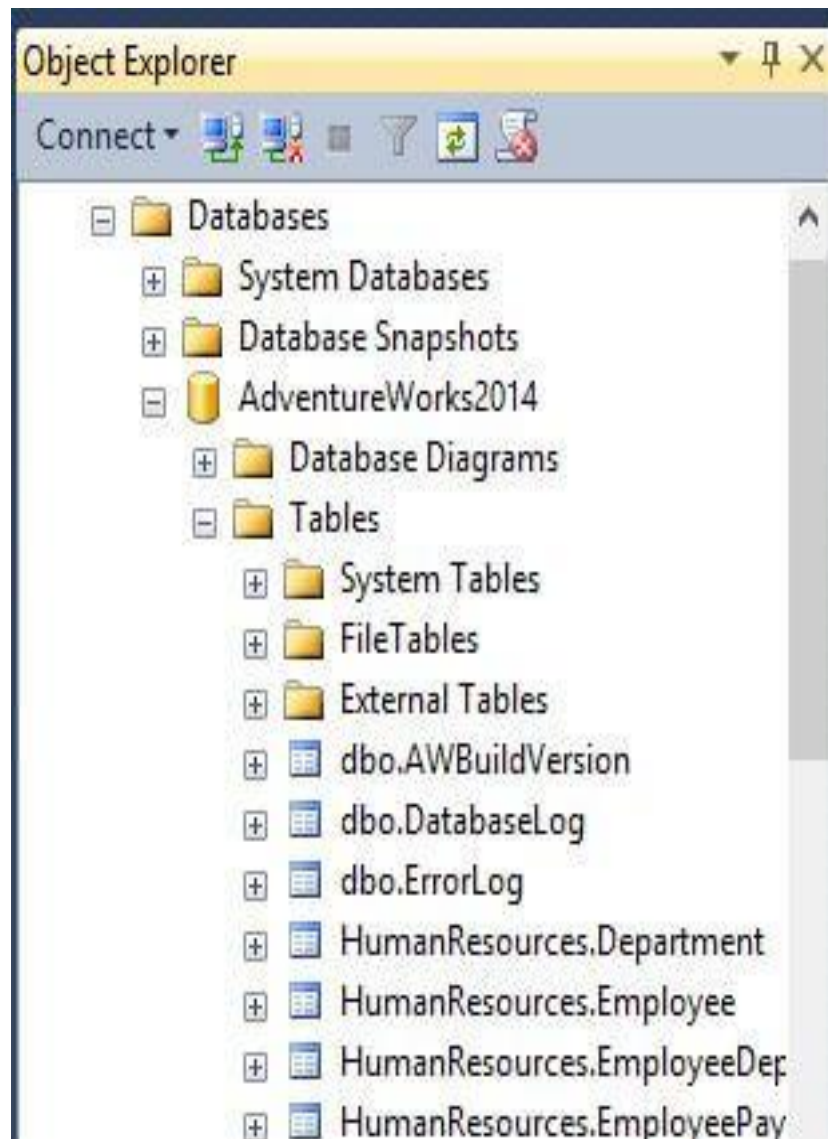
In the Restore Database window, the database name will be populated. Click on OK to begin the restoration process. A progress bar will appear at the top of the window.



Upon successful completion, the following window will appear. Click on OK.



Go to the Object Explorer in SQL Server Management Studio and browse the objects in AdventureWorks2014. If the AdventureWorks2014 database does not appear, right-click on Databases and choose Refresh.



On completion, please upload documentation relating to the project deliverables and a completed project declaration (provided separately) to the relevant folder location as specified by your training provider. Alternatively, please send to epateam@bcs.uk