

IBM Integration Bus

Message Modeling with DFDL

Lab 4 Record-oriented, tagged, delimited text (advanced)

Featuring:

Schema references Initiators, separators, terminators Arrays - element count provided explicitly within data Unordered sequences Arrays - element count given by parsing data

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1. Introduction

1.1 Lab objectives

In this lab you are going to extend the message model you created in the previous (basic TDS) lab, Lab3.

The lab examines more complex structures, such as schema references, element delimiters like initiators, separators and terminators, and the ability to handle variable numbers of elements.

Chapters 5 and 6 contains scenarios that are supported only in IIB V9.0.0.2 and later (inc V10). These scenarios are arrays where the count does not occur in the data and is established solely by parsing (by setting the Occurs Count Kind property to "parsed"), and sequences where the elements occur in any order (by setting the Sequence Kind property to "unordered").

1.2 Lab preparation

If you did not do Lab 3 (the basic TDS lab), you can import a pre-built solution. Import the PI file

```
c:\student10\message_modelling\solution\
MessageModelSolution_TDS_Basic_Lab3(SharedLib).zip
```

If you wish to proceed straight to the new function provided in IIB V9002 (Occurs Count Kind=parsed in chapter 5 and unordered sequences in chapter 6), import the partial solution of this lab:

```
c:\student10\message_modelling\solution\
MessageModelSolution_TDS_Advanced_Lab4(SharedLib-PartialSolution).zip
```

A complete solution of this lab is provided in:

c:\student10\message_modelling\solution\ MessageModelSolution_TDS_Advanced_Lab4(SharedLib-FullSolution).zip

If you import one of the PI files provided above, the imported library will be called

MessageModelling_TDS

1.3 TDS Basic Lab Recap

In the TDS basic lab, you created a message model to parse this data file. The file has a single Company record which contains multiple Employee records.

Company.txt - Notepad		c j
File Edit Format View Help		
<pre>[company[compname=wy company [mp]oyee(empNum=11111]dept=500[empName=Alice wong]Addr:8200 warden Ave,"Markham, Ont",L3G.1H7[te]=905-347-5649[sa]=135599.95) Emp]oyee(empNum=222222]dept=500[empName=Blames May[Addr:23 The Cuttings,Chatham,CH2 2PR[te]=208-203-1332[sa]=189599.95) Emp]oyee(empNum=232333]dept=310[empName=Richard Hammond Addr:16Great Windmill,London,W2 3R3[te]=207-445-295[sa]=599.95) Emp]oyee(empNum=444444 [dept=230]empName=Picmare]Addr:01Addr:16Great Windmill,London,W2 3R3[te]=207-445-295[sa]=599.95) Emp]oyee(empNum=444444 [dept=230]empName=Picmy[Clarkeson[Addr:*Rose Cottage, Pea Dr",Gloucester,GL01 2NM[te]=743-123-4567[sa]=75599 Emp]oyee(empNum=555555[dept=650]empName=Humphrey Littleton[Addr:416 Regent Street,London,Nw1 1qT[te]=207-883-1238[sa]=99999.95)]</pre>	.95)	*
		-
4	Þ	

So you defined the following DFDL structure like this:

🖃 🖻 Company				
sequence				
e CompanyName				
Employee				
🖃 🚥 sequence				
e EmpNo				
e Dept				
e EmpName				
🖃 🖻 Address				
🖃 🚥 sequence				
e StreetName				
e City				
e ZipCode				
e Tel				
e Salary				

1.4 TDS Advanced Scenario

In this lab, you will extend the message model created in the Basic scenario so that it can parse the following data file, which contains multiple Company records.

In the first part of this lab (chapter 3), the number of Company records is specified by the compCount element in the Header record (the supplied test file has a value of 5).

📃 Companies.txt - Notepad
File Foit Format View Help
Header{recDesc:My Company records,compCount:5}
<pre>Employee(empNum=111111 dept-500 empName=Alice wong Addr:8200 Warden Ave,"Markham, Ont",L3G 1H7 tel=905-347-5649 sal=135599.95) Employee(empNum=222222 dept=500 empName=almes May Addr:23 The Cuttings,Chatham, CH2 2PR tel=208-203-1332 sal=6189599.95) Employee(empNum=3333]dept=310 empName=Richard Handurd Addr:16 Great Windmill St,Lordor,W2 3RJ Lel=207-445-2955 sal=599.95) Employee(empNum=444444 dept=230 empName=Jeremy Clarkeson Addr:"Rose Cottage, Pea Dr",Gloucester,GL01 2NM tel=743-123-4567 sal=5599.95) Employee(empNum=555555 dept=650 empName=Humphrey Littleton Addr:416 Regent Street,London,NW1 1QT tel=207-883-1238 sal=99999.95) </pre>
Compary[compName=IBM Employee(empNum=1I1111 dept=9876 empName=Arnold Buzby Addr:1000 The Close,Winchester,L3G 1H7 tel=905-345-5649 sal=23.54) Employee(empNum=222222 dept=2350 empName=Digby Jones Addr:1 Porstmouth Rd,Southampton,CH2 2PR tel=208-203-1332 sal=599.95)
d Company[compName=Rig Rank Employee(empNum=111111 dept=1 empName=Mr Big Addr:99 Sicillian Dr,"Palermo, NY",L3G 1H7 tel=905-347-5649 sal=4599.00) Employee(empNum=000001 dept=1 empName=Homer Simpson Addr:Two's complement,Springfield,1011001 tel=208-203-1332 sal=189599.94) Employee(empNum=333333 dept=2 empName=Lucy Wetherel1 Addr:23 Gas st,Bolton,W2 3RJ tel=207-445-2955 sal=599.95)
Company[compName=Huge Store Employee(empNum=111111 dept=20 empName=George Formby Addr:1 HotPot Rd,Lancashire,L3G 1H7 te1=905-347-5649 sa1=85599.95) Employee(empNum=222222 dept=18 empName=Ivor Engine Addr:1234 London Rd,Llangollen,CH2 2PR te1=208-203-1332 sa1=9.95)]
Company[compName=Corner store Employee(empNum=100001 dept=4456 empName=Captain Flack Addr:The Fire Station.Trumpton.L3G 1H7 tel=905-347-5649 sal=12345.95) Employee(empNum=100002 dept=4429 empName=Captain Pugwash Addr:The Black Pig,Smugglers Cove,CH2 2PR tel=208-203-1332 sal=654321.91) Employee(empNum=100003 dept=4429 empName=Lady Penelope Addr:Treighton Ward Mansion,Buckinghamshire,W2 3R3 tel=207 445 2955 sal=599.95) Employee(empNum=100004 dept=4483 empName=Lady Penelope Addr:Tracy Island,Pacific Ocean,Gu022Wh[tel=743-123-4567]sal=7599.23) Employee(empNum=100005 dept=4480 empName=Grdon Iracy Addr:Tracy Island,Pacific Ocean,Gu022Wh[tel=743-123-4567]sal=7599.23) Employee(empNum=100005 dept=4400 empName=Gordon Iracy Addr:Iracy Island,Pacific Ocean,Gu12UN[tel=207-863-1238 sal=666.67)
Trailer{chksum:1234567890}

So you will need to create a structure like this. The Companies schema will use a schema reference to the Company schema that was generated in Lab3.

	🖃 🖻 Companies				
	🖃 🚥 sequence				
	🖃 🖻 Header				
	🖃 🚥 sequence				
	e RecordDescription				
	e CompanyCount				
1	🖃 🐙 Company				
i	🖃 🚥 sequence				
	e CompanyName				
	🖃 🖻 Employee				
	🖃 🚥 sequence				
	e EmpNo				
	e Dept				
	e EmpName				
	🗈 🖻 Address				
	e Tel				
e Salary					
	🖃 🖻 Trailer				
	ess sequence				
	e chksum				

In the next part, chapter 5 shows you how to automatically detect the number of company records. The DFDL parser can be defined to detect the number of Company elements without using the compCount element.

Finally, chapter 6 shows you how to switch the order of the Header elements without having to redefine the order of the elements in the model.

Message Modelling - Record Oriented Text - Advanced Lab

2. Create the Message Model in the Library

1. Use either the library you created for Lab 3 (MessageModelingLibrary), or the provided solution for Lab 3 (MessageModelling_TDS).

Click New->Message Model to create a new DFDL Schema.

🔚 Application Development 🛛	🖧 Patterns Explorer		
	Æ	□ \$	\bigtriangledown
Application Development		Ne	<u></u>
🖃 💒 MessageModelling_TDS			New Artifact
🖻 🧀 Schema Definitions			Message Flow
Company.xsd	ice) i		
the http://www.ibm.o	.com/dfdl/RecordSeparat	tedFieldFor	m 📑 Message Model
			Message Map
			ESQL File
			MQ Service
			Database Service
			Quick Start
			-

2. In the "New Message Model" wizard, select "Record-oriented text" and click Next.

🜐 New Message Model	
Create a new message r	model file
Select the message model ty	pe or format
XML	
O SOAP XML	XML data for use in Web Services.
O Other XML	All other XML data.
Text and binary	
C CSV text	Comma Separated Values data, a delimited text format commonly used as an export format by spreadsheets and databases.
Record-oriented text	Text data formats where delimited fields are grouped into records.
C COBOL	Data for COBOL programs
O C	Data for C programs
O Other text or binary	All other text or binary data formats.
False in the second second	
C CAD	Data from SAD systems including IDos and RADI
O Siebel	Data from SAP systems including IDDC and DAP1
C DecelsCoft	Data from Siebel Systems
C 10 Edwards	Data from Peopleson
S JD Edwards	Data from JD Edwards systems
Other	
C CORBA IDL	Data from CORBA
C Database record	Records from relational databases
	Data for extended email format
C IBM supplied	Predefined data format
?	< Back Next > Finish Cancel

3. From the wizard, select "Create a DFDL schema file using the wizard to guide you" and click Next.

🛞 New Message Model
Record-oriented text
Choose how you would like to create your text data message model.
Integration Bus requires a message model in order to parse, serialize and validate record-oriented text data. A message model also speeds up development of your integration applications by enabling ESQL content assist and graphical maps.
Create a DFDL schema file using this wizard to guide you
O Create an empty DFDL schema file, I will model my data using the DFDL schema editor
O Import or replace the IBM supplied DFDL schema property defaults for Record-oriented text.
The first option is suitable if you have a text format that consists of a number of records or segments (optional header, repeating body, optional trailer). The records can have either fixed-length or variable-length fields. The records and fields can have initiators.
Image: Contract of the state of the sta
Cancel

4. Enter "Companies" as the DFDL Schema file name and ensure the Library name is set to the correct value (our example is using MessageModelling_TDS).

Click Next.

🌐 New Message Mod	2		<u>- </u>				
Create a Data Format Description Language (DFDL) Schema Specify the location and name of the DFDL schema, and specify the name of the message.							
Application or Library:	MessageModellingLibrary	Browse	New				
Folder:	<specifying a="" folder="" is="" optional=""></specifying>	Browse	New				
DFDL schema file name:	Companies						
Message name:	Companies						
?	< Back	Next > Finish	Cancel				

Note that the Message name will auto complete based on the DFDL schema file name.

5. Leave the "End of record character" default value (carriage return, line feed).

Leave the "The first record is a header" and "The last record is a trailer" checked.

In the Header fields tab, enter "Header{" as the Header initiator, and set "Number of fields" = 2.

Change the Escape scheme to "**Default escape scheme**". Note that in versions of IIB prior to V9.0.0.2, the Escape scheme was automatically set to this value. The default escape scheme is required in this lab, because there is an element in the test data which has a value containing embedded comma (,) which needs to be escaped.

🌐 New Message Model	<u>_ ×</u>
Configure schema for data formatted as records and fields Provide setting for new DFDL schema that represent record-oriented data.	S
Record settings End of record character: Carriage Return & Line Feed - %CR; %LF; (Blank records will be skipped) Image: The first record is a header Image: The last record is a trailer	
Header fields Body fields Trailer fields Header initiator: Header{ Number of fields: 2	
Field settings Separated by: - %#124; (UTF-8: 0x7C) (UTF-16: 0x007C) Fixed length All fields have an initiator Create default values for fields	
Encoding code page options: (provided to the processor by the application at runtime) © Fixed US-ASCII	_
Global settings Escape scheme: Default escape scheme	•
Sack Next > Finish	Cancel

6. Click on the "Trailer fields" tab, and enter "Trailer{" as the Trailer initiator and set "Number of fields" = 1.

Click Finish.

New Message Model						
Configure schema for data formatted as records and fields Provide setting for new DFDL schema that represent record-oriented data.						
Record settings End of record character: Carriage Return & Line Feed - %CR;%LF; (Blank records will be skipped) IV The first record is a header IV The last record is a trailer						
Header fields Body fields Trailer fields Trailer initiator: Trailer{ Number of fields: 1						
Field settings Image: Separated by: Image: Fixed length Image: Fixed length </td						
Encoding code page options: O Dynamic (prov O Fixed US-7	ided to the processor by the a	application at	runtime)	Y		
Escape scheme: Default escape scheme						
•	<	Back	Next >	Finish Cancel		

3. Refine the Message Model

1. The DFDL editor will open with the generated DFDL Schema.

Click the "Show all sections" icon.

If you are using IIB V9.0.0.1 or earlier, you will also see the "Show Advanced" icon. You should click this icon now. In V9.0.0.2 (and in V10), this icon has been removed, and has been replaced by a small icon in the Representation Properties (see the arrowed icon below). The default is that Advanced properties are shown.

Co	mpanies.xsd 🛛							- 6
Test	Parse Model Test Serialize Mod	el Hide properti	Show all sections	iocus on selecte	ed Show qu	ick outline Create logical instance	2	
* [▼Messages 🖉 🖗 🕀 💥 🕌							
An	nessage is a global element that	models an entire	document of data.	_		Companies (Element)		(?)
	Name	Type Min Oc	curs Max Occurs	Default Value	Sample Va	<type filter="" text=""></type>	과 昆 × 🐝	
	Companies					Property	Value	()
	🖃 🚥 sequence	1	1			Comment S		
	: 🗉 e header	1	1			General		
	: 🗉 e body	1	unbounded			Content		
	: • e trailer	1	1			Length Kind	🛃 delimited	
	Add a Local Element					Occurrences		
						Min Occurs S	累 1	
						Max Occurs S	冕 1	
						Alignment		
						Delimiters		
					I			

2. Click the twisty next to the "Schema References" section to expand the references (Includes and Imports) of the DFDL Schema file.

0 Companies.xsd 🛛					
E, Ei		A		ii	
Test Parse Model Test Serialize Model	Hide properties	Hide empty sections	Focus on selected	Show quick outline	Create k
▼Schema 🛛 📮 🛃 🗸	. t 1) 🗐 🔤 	6 6 6		
Namespace <null namespace=""></null>			Chan	ge namespace	
▶ Schema References (1 inclu	ıde, 1 import)				
A schema file in the same namespa	ace uses an include.	. A schema file in a di	fferent namespace u	ses an import.	
			-		
-Massagar	л 🖌 Е				
Tressages & a a	× • • • •	EU			
A message is a global element that m	odels an entire doc	ument of data.			
Name	Type Min Occurs	s Max Occurs	Default Value Sam	ple Value	
🖃 🖻 Companies					
⊟ ∞∞ sequence	1	1			
: 💿 header	1	1			
: 🛨 e body	1	unbounded			
: 🛨 🖻 trailer	1	1			
Add a Local Element					

3. This message model is going to build on the message model from the basic TDS lab, by creating a reference to the Company schema.

Click the "Add a reference to another schema" icon.

0 Cor	mpanies.xsd	x																
	E		Εô						4					Ð			E	
Test P	Parse Model	Test Se	rialize	Model	Hide	properti	es	Hide	empt	y sect	ions	Fo	cus o	n sel	ected	Shov	v quick outline	Crea
*5	chema	ą	F	e 📮	F	₽ [ò ,	1	2	80	Ë,	E	E	Ŀ	B			
ľ	Namespace	<null na<="" td=""><td>mespa</td><td>ace></td><td></td><td>_</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Change name</td><td>space</td></null>	mespa	ace>		_											Change name	space
	Schema Re	eferen	ces		<u>ک</u>	¢												
4	A schema file i	in the sa	ame na	ameeper		an ind	ude	. A sc	hema	file in	a di	iffere	nt na	mes	bace u	ises ar	n import.	
	Imports IBI	Mdefine	d/Rec	ordSepa	arated	dFieldFor	mat	.xsd	ht	ф://w	ww.	.ibm.c	:om/c	lfdl/F	lecord	Separ	atedFieldForm	at
₹M	lessages	/ 🐺		2 仓	Ŷ	×	E	Eo										
Am	iessage is a g	lobal ele	ement	that mo	dels a	an entire	doc	umen	t of d	ata.								
	Name			Ту	pe	Min Occu	Irs	Max	Occu	rs	De	efault	Valu	e	Sampl	e Valu	e	
	🗆 e C	ompanie	s															
		• seque	nce			1		1										
	: B	E 🕑 he	ader			1		1										
	: 8	E e bo	dy			1		unbo	unde	d								
	: B	E e tra	ailer			1		1										
	Add a Local F	Element																

4. In the "Add Schema Reference" window, leave the default "Reference a file in the workspace" option and click Browse.

Add Schema Reference	
C Reference an IBM-supplied data format	Browse
DFDL IBM Supplied FormatsCOBOLC	A general purpose Data Format Description Language (DFDL) format for use when modeling text or binary data starting from an empty model.
Namespace: Directive:	<u> </u>
	OK. Cancel

5. Select the "Company.xsd" file you created in the previous (basic) lab, or the one in the prebuilt library, MessageModelling_TDS.

Click OK.

File Selection	<u> </u>
Choose a file:	
MessageModellingLibrary Company.xsd IBMdefined	
ОК	Cancel

Back in the "Add Schema Reference" window click OK.

- 6. Note that you have two Schema References:
 - Company.xsd (which you've just added).
 - RecordSeparatedFieldFormat.xsd (which was automatically added by the wizard): This contains Record Separated specific defaults for DFDL properties. This schema already existed in the library (it is an IBM-defined schema), and Companies.xsd now has a reference to this existing schema.

Company.xsd	Companies.x	sd 🖾						
E	E		A		ta da			
Test Parse Model	Test Serialize Model	Hide properties	Hide empty sections	Focus on selected	Show quick outline	Create lo		
▼Schema	J = = =	F 7 A	Ja 1 🗄 🗄	6 6 6 E				
Namespace	<null namespace=""></null>				Change name	space		
▼Schema R	eferences	🛛 💥	o. A ochoma filo in a di	fforont nomono cou	ince an import			
A schema file in the same namespace uses an include. A schema file in a different namespace uses an import. Includes Company.xsd								
Imports I	BMdefined/RecordSep	aratedFieldForma	at.xsd http://www	.ibm.com/dfdl/Record	dSeparatedFieldForm	at		

7. Click anywhere inside the Companies Message section, and click on the "Focus on selected" icon.

Then, expand the header element by clicking the "+".

	E E			A			E		
Test	Parse Model Test Serialize Mo	del Hide	e properties	Hide empty section	ns Focus on se	elected Show	quick outline	Cre	
▶ Schema									
▼ N An	▼Messages								
		_							
	Name	Туре	Min Occurs	Max Occurs	Default Value	Sample Value			
	Name	Туре	Min Occurs	Max Occurs	Default Value	Sample Value			
	Name Companies Sequence	Туре	Min Occurs	Max Occurs	Default Value	Sample Value			
	Name Companies Comp	Туре	Min Occurs	Max Occurs 1 1 1	Default Value	Sample Value			
	Name	Туре	Min Occurs 1 1 1 1	Max Occurs 1 1 1 unbounded	Default Value	Sample Value			
	Name Companies Comp	Туре	Min Occurs 1 1 1 1 1	Max Occurs 1 1 1 unbounded 1	Default Value	Sample Value			

8. Change the header element's name to "Header" (capital "H") by highlighting it, and overtyping.

Name	Туре	Min Occurs	Max Occurs	Default Value	Sample Value
🖃 🖻 Companies					
		1	1		
: e e Header		1	1		
sequence		1	1		
e head_elem1	string	1	1		head_value1
e head_elem2	string	1	1		head_value2
: 💿 e body		1	unbounded		
🗄 💼 trailer		1	1		
Add a Local Element					

9. Change the 2 elements under Header to "RecordDescription" and "CompanyCount".

If you wish, you can also change the sample values, as shown.

Name		Туре	Min Occurs	Max Occurs	Default Value	Sample Value
🖃 🥑 Compar	nies					
🖃 🚥 seq		1	1			
: e		1	1			
Ξ	•• sequence		1	1		
1	e RecordDescription	string	1	1		RecDesc
1	e CompanyCount	string	1	1		CompCount
: • e		1	unbounded			
: e		1	1			
Add a Local Eleme	<u>nt</u>					

10. Delete the "body" element by right-clicking on the line of the element and selecting Delete. (Do not right-click on the text of the element name ... you will see a different context menu).

Name		Tune	Min Occurs	Max Occurs
Name		турс	- Mill Occurs	Max Occars
- e	Companies			
	••• sequence		1	1
1	🖃 🖻 Header		1	1
	🖃 🚥 sequence		1	1
1	e RecordDescription	string	1	1
1	e CompanyCount	string	1	1
1	. E pody	•	1	unbounded
-	Make Local Element Global	Alt+Shift+E		1
Add a Loc	Move to a New Model Group	Alt+Shift+G		
	😚 Move Up	Alt+Up		
	🕂 Move Down	Alt+Down		
	o∱ Cut	Ctrl+X		
	📔 Сору	Ctrl+C		
	Paste	Ctrl+V		
	💥 Delete	Delete		
	••• Add Sequence	Ctrl+L, S		
	🔂 Add Choice	Ctrl+L, C		

11. Change the trailer element's name to "Trailer" (capital "T").

Change the name of the element under Trailer to "ChkSum".

Name	Туре	Min Occurs	Max Occurs	Default Value	Sample Value
e Companies					
🖃 🚥 sequence		1	1		
😑 🖻 Header		1	1		
sequence		1	1		
e RecordDescription	string	1	1		RecDesc
E CompanyCount	string	1	1		CompCount
: 😑 🖻 Trailer		1	1		
		1	1		
E ChkSum	string	1	1		checkSum
Add a Local Element					

12. Earlier, you added a reference to the Company.xsd schema.

You are now going to use this reference, by adding an Element Reference in the appropriate part of the Companies message.

To do this, right-click on the Companies' "sequence" element and select "Add Element Reference". Note - you must position the mouse to the right of the word "sequence". If you are too close, a different context menu will appear.

Name	Туре	Min Occurs	Max Occurs	Default Value		
🖃 e Companies						
🖃 🚥 sequence	Moye Lir		•			
: 🖃 🖻 Header	Move Cop Move Down					
sequence						
e RecordDescription	Paste					
e CompanyCount	💥 Delete					
: 😑 e Trailer	🛵 Add a Lo	cal Element				
sequence	🖉 Add Con	nplex Local El	ement			
: e ChkSum	🚥 Add Seq	uence				
Add a Local Element	🕂 Add Cho	ice				
	🞜 Add Eler	nent Referen	ce			
	회 Add Gro	up Reference	····			
	Add Hide	den Group Re	ference (not si	upported in curre		

13. Select "Company :" from the dropdown

Click OK.

🌐 Add Element F	leference			
Select an element:	Company :		•	Browse
	Companies :			
	Company :			
		OK		ancal
		UK .		

14. The new element has to be positioned correctly, so right-click on the newly added element reference, and select "Move Up".

Name		Туре	Min Occurs	Max Occurs	Default Value	Sample Value
e Companies						
sequence			1	1		
: 😑 🖻 Header			1	1		
sequence			1	1		
e RecordDescrip	string	1	1		RecDesc	
e CompanyCour	string	1	1		CompCount	
: 😑 🖻 Trailer			1	1		
sequence			1	1		
: e Ch 🛶		string	1	1		checkSum
🗄 🕀 📌 Company 😕		Move to a	New Model G	roup Alt+Shift	+G	
Add a Local Element		Movello				
		Move Op Move Dov	۹D	Alt+Dowr	ì	
	•	<pre> Cut </pre>		Ctrl+X		
		Сору		Ctrl+C		
		Paste		⊂trl+-V		
	3	🕻 Delete		Delete		

Note that the added element reference has a different icon 💷 to differentiate from a regular element (this is only a reference to an existing element in another DFDL schema).

Also note that the element reference's name is greyed out because it is read-only. To modify it you will need to open the DFDL schema where it was defined clicking on the yellow arrow that appears when you hover over the element.(\Rightarrow).

When you have moved the Company element, the model will look like this.

Name	Туре	Min Occurs	Max Occurs	Default Value	Sample Value
🖃 e Companies					
sequence		1	1		
😑 😑 Header		1	1		
sequence		1	1		
e RecordDescription	string	1	1		RecDesc
e CompanyCount	string	1	1		CompCount
: 🕞 📌 Company		1	1		
i 🖃 🚥 sequence		1	1		
e CompanyName	string	1	1		а
🗈 🖻 Employee		1	unbounded		
: 😑 🖻 Trailer		1	1		
sequence		1	1		
: e ChkSum	string	1	1		checkSum
Add a Local Element					

15. Expand both the Header and Trailer elements by clicking the "+" next to them.

Name	Туре	Min Occurs	Max Occurs	Default Value
e Companies				
sequence		1	1	
E Header		1	1	
: 🕞 📌 Company		1	1	
: e Trailer		1	1	
Add a Local Element				

16. Change the CompanyCount element type to "integer" by clicking its type column and selecting "integer" (not int).

Name	Туре	Min Occurs	Max Occurs	Default
🖃 e Companies				
sequence		1	1	
😑 🖻 Header		1	1	
sequence		1	1	
e RecordDescription	string	1	1	
E CompanyCount	integer	1	1	
: 🗉 📌 Company	🗆 decima			
: 💿 Trailer	🖃 double			
Add a Local Element	 float hexBin: int integer long nonNeg short string time 	ary gativeInteger		

17. Click the CompanyCount element again, and look at the "Delimiters" section in the Representation Properties.

Name	Туре	Min Occurs	M	<type filter="" text=""></type>	≱易 ×	× .
🖃 🖻 Companies				Property	Value	
🖃 🚥 sequence		1	1	Comment S		
🖃 🖻 Header		1	1	🗄 General		
sequence		1	1	Content	integer	
e RecordDescription	string	1	1	Text Content		
e CompanyCount	integer	1	1	Occurrences		
E Company		1	1	Min Occurs S	1 1	
+ e Trailer		1	1	Max Occurs S	1 1	
Add a Local Element				Floating	暑 no	
			11	Alignment		
				🕞 Delimitere		
				Initiator	iHead2	
				Terminator	🛃 <no terminator=""></no>	
				Nil Value Delimiter Policy	🛃 initiator	
				Empty Value Delimiter Policy	Pa Initiation	
				Output New Line	星 %CB:%IE:	

18. Change the Initiator's value ("iHead2") to "compCount:" (don't miss out the : (colon)).

🔲 Representation Properties 🛛 🛤 Variables 📄 🔚 Asserts and Discriminators									
CompanyCount (Element)	0								
<type filter="" text=""></type>	🗶 💥 🖽 🖻								
Property	Value (?)								
Comment									
🖃 General									
Encoding (code page)	🛃 <dynamically set=""></dynamically>								
Byte Order	🛃 <dynamically set=""></dynamically>								
Content	integer								
Representation	🛃 text								
Length Kind	🛃 delimited 📃								
Default Value	<unset></unset>								
Text Content									
	🛃 standard								
Escape Scheme Reference	RecordEscapeScheme								
Occurrences									
Min Occurs	暑 1								
Max Occurs	暑 1								
 Delimiters 									
Initiator	compCount:								
Terminator	🛃 <no terminator=""></no>								
+ Validation	integer								

19. Repeat the previous step for the "RecordDescription" and ChkSum fields with the following values:

RecordDescription	recDesc:
ChkSum	chksum:

Again, do not miss the colon characters. The case of the property values is important.

Record Description:

							RecordDescription (El	ement)	
×M	lessages 🔄 🙀 🖓 🦊 🕱	Ei Ei							
Am	essage is a global element that models an entire	document of	data.				<type filter="" text=""></type>	_ 🛱 🖪 🗱 🖽	
							Property	Value	
	Name	Туре	Min Occurs	Max Occurs	Default Value	Sample V	Comment S		
	🖃 e Companies						General		
	⊒ ∞∞ sequence		1	1			Content	string	
	🖃 😑 Header		1	1			Text Content		
	a sequence		1	1			Occurrences		
	e RecordDescription	string	1	1		RecDesc	Alignment		
	e CompanyCount	integer	1	1		1	Delimiters		
	E P Company	_	1	unbounded			Initiator	recDesc:	
			1	1			Terminator	昗 <no terminator=""></no>	
	Add a Local Element		-	•			Nil Value Delimiter P 🛃 initiator		
-	Add a cocar cicilient								

ChkSum (in Trailer):

								ChkSum (Element)	
• r A m	nessage is a global eler	nent that models an entire	e⊳ eu document of	data.				<type filter="" text=""></type>	📑 🖪 🗙 🔆 🕀
								Property	Value
	Name		Туре	Min Occurs	Max Occurs	Default Value	Sample V	Comment S	
	😑 🖻 Companie	;						General	
	= 🚥 sequer	nce		1	1			Content	string
	: e He	ader		1	1			Text Content	
	: 🛛 🕂 🚝 Co	npany		1	unbounded			Occurrences	
	: 😑 e Tra	iler		1	1			Alignment	
		sequence		1	1			Delimiters	
	1	e ChkSum	string	1	1		checkSurr	Initiator	chksum:
	Add a Local Element							Terminator	🚪 <no terminator=""></no>
								Nil Value Delimite	er P 🛃 initiator
								Empty Value De	imit 🗏 initiator

20. Now click the <sequence> content of the Companies element.

In the Representation Properties, expand the Delimiters section. Delete the value of the Separator property. Click Return to make sure the value is updated. (This is a separator automatically added by the wizard, which is not needed in this case)

Fest Parse Model	Test Serialize Model	Hide properties	Hide empty se	ctions Focus on	selected Show q	녑 uick outline C	eate logical instance		
chema							A Representation Prop	e (M)= Variables **1	
		~ F F					sequence		(?
essage is a global	element that models a	an entire documen	t of data.				<type filter="" text=""></type>	🗦 🖪 🗙 💥 🛛	
Namo	®	Turne	Min Occu	May Occurs	Dofault Value	Comple Valu	Property	Value	(?)
Name	-	Type	Millioccu	IS Max Occurs	Derault value	Sample valu	H General		
e Compa	nies						+ Content		
😑 🚥 <mark>38</mark> 0	uence		1	1			Occurrences		
: e	Header		1	1			Alignment		
Ξ	sequence		1	1			Delimiters		
	e RecordDescrip	tion string	1	1		head value	Separator	₽ Π	
		integer	1	1		1	Separator S	uppi anyEmpty	
	Companycouri	it integer	-			-	Separator P	Positi 🛃 infix	
: ± <u>j</u>			1	1			Initiator	🖳 <no initiator=""></no>	
: 🖃 🖻	Trailer		1	1			Terminator	<pre>no terminator ></pre>	
Ξ	sequence		1	1			Output New Lin	e 🗏 %CR:%IE:	
	e ChkSum	string	1	1		trailer value	1	a a rearry fact y	

21. Click the Header element. In the Representation Properties Delimiters section, set the Terminator property to "}%CR;%LF;" (the end of the Header record is a }, followed by CRLF).

*Companies.xsd	x									
Test Parse Model	Test Serialize Model	Hide properties	Aide empty section	ns Focus on sel	ected Show qu	ick outline	Create	logical instance		
Schema							-	Representation Prope	erties 📄 Asserts a	nd Discriminator
								Header (Element)		(?)
message is a global e	리 🍋 다 📀 lement that models a	n entire documen	t of data.					<type filter="" text=""></type>		
Name		Type	Min Occurs	Max Occurs	Default Value	Sample Va	lue	Property	Value	<u> </u>
	ies	. //						General		
	ience	-	1	1			- 1	Content		
	leader		1	1			-1	Occurrences		
			1	1			- 1	+ Alignment		
	e RecordDescrip	tion string	1	1		head valu	e1	Delimiters		
	e CompanyCoun	t integer	1	1		1		Tributor	Header (
: 🗉 🐙 🕻	Company		1	1				Terminator	}%CR;%LF;	
: = e T	railer		1	1			- 11	Document		
	·· sequence		1	1			- 11	Empty Value Del	limit 🛃 initiator	
:	e ChkSum	string	1	1		trailer_val	ue1	Output New Line	e 嚣 %CR;%LF;	
Add a Local Elemen	<u>nt</u>									

22. Then click the <sequence> content of the Header element and in the Delimiters section again, set the Separator property to "," (header elements are separated by a comma).

I *Companies.xsd ⋈							- 8
Test Parse Model Test Serialize Model Hide propert	🚊 ies Hide empty se	ections Focus on selected	ed Show quick outlin	e Create	logical instance		
▶ Schema				-	Representation Prope	(×)= Variables »1	
					sequence	16 18	?
A message is a global element that models an entire	document of data				<type filter="" text=""></type>	🐴 🖪 🗙 💥 🛛	€ 🕒 🖶
	1				Property	Value	?
Name	Type Min	Occurs Max Occurs	Default Value S	ample \	🕀 General		
🖃 🖻 Companies					Content		
sequence	1	1			+ Occurrences		
😑 🖻 Header	1	1			Alignment		
- sequence	1	1			Delimiters		
e RecordDescription	strina 1	1	h	ead va	Separator	,	
e CompanyCount	integer 1	1	1		Initiator	🛃 <no initiator=""></no>	
E Company	1	1			Terminator	🛃 <no terminator=""></no>	
	-	-			Output New Line	暑 %CR;%LF;	
	1	-					
🖃 🚥 sequence	1	1					
e ChkSum	string 1	1	t	railer_v			
Add a Local Element							

23. Click the Trailer element, and in the Delimiters section, set the Terminator property to "}".

0 *Companies.xsd 🛛										- 8
Test Parse Model Test Serialize Model	Hide propertie:	; Show basi	Show all section	ins Focusion	selected SH	ti ow quick outline	Create logical	instance		
▶Schema							<u> </u>	Representation Prope	E Asserts and Discrimi	` 1
								Trailer (Element)		(?)
Messages Image: Image								<type filter="" text=""></type>	X §	k <mark>R</mark> ⊞ ⊟
								Property	Value	(?)
Name	Type M	in Occurs M	ax Occurs D	efault Value	Sample Valu	e		Comment S		
🖃 🖻 Companies								⊕ General ■		
🖃 🚥 sequence	1	1						 Content 		
🛛 🗈 e Header	1	1						Occurrences		
Company	1	ur	bounded					 Alignment 		
🖃 🖪 Trailer	1	1						 Delimiters 		
	1	1						Initiator	Trailer{	
i e chkum	string 1	1			trailer value	1		 Terminator 	}	
Add a Local Element	Juny 1				craitor_valae			Document Final T	em 😤 yes	
Add a Local Liement								Empty Value Delimiter	r Pc 晃 initiator	
▶Data Formats (1 format)								Output New Line	🛃 %CR;%LF;	

24. Click the <sequence> content of the Trailer element and in the Delimiters section, delete the Separator property's value.

❶ *Companies.xsd ⊠								- 8
Test Parse Model Test Serialize Model Hide propert	ies Hide	empty sections	Focus on selected	ti Show quick ou	itline Crea	te logical instance		
▶ Schema					4	Representation Prope	ariables [»] 1	
						sequence		?
A message is a global element that models an entire		<type filter="" text=""></type>	× 🔆 🕀 🛛					
Name	Туре	Min Occurs	Max Occurs	Default Value	Sample \	Property Value		(?)
E Companies						Content		
E ···· sequence		1	1			Occurrences		
E e Header		1	1			Alignment		
🖃 🚥 sequence		1	1			C Delimitere		
e RecordDescription	string	1	1		head_va	Separator <no se<="" td=""><td>eparator></td><td></td></no>	eparator>	
E CompanyCount	integer	1	1		1	Initiator 🖁 <n< td=""><td>o initiator></td><td></td></n<>	o initiator>	
: 🕀 📌 Company		1	1			Terminator 😤 <n< td=""><td>o terminator></td><td></td></n<>	o terminator>	
: e Trailer		1	1			Output New Line 😤 %	LR;%LF;	
sequence		1	1					
: e ChkSum	string	1	1		trailer_v			
Add a Local Element								

25. Click the "Max Occurs" column of the Company element reference, and change it from "1" to "unbounded".

This will allow the Company element reference to have infinite occurrences.

Na	me	Туре	Min Occurs	Max Occurs	Defau
	e Companies				
	sequence		1	1	
-	🖃 🖻 Header		1	1	
	sequence		1	1	
-	e RecordDescription	string	1	1	
÷	e CompanyCount	integer	1	1	
÷	🗄 📌 Company		1	unbounded	
-	🖃 🖻 Trailer		1	i	
	sequence		1	1	
:	e ChkSum	string	1	1	
Ad	d a Local Element				

26. Click the Show all Properties button in the Representation Properties.

Representation Properties 📙 Asserts and Discriminator							
Company (Element)		?					
<type filter="" text=""></type>	🔆 🔜 🗶 🐂	⊟ ♣					
Property	Value	?					
Comment							
General							
Content							
+ Occurrences							
Delimiters							
Initiator	뿸 Company[
Terminator	昂]%CR;%LF;						

27. Click the Company element reference. In the Representation Properties Occurrences section, change the "Occurs Count Kind" from "implicit" to "expression".

You may need to Save the model and close and reopen the schema to update the Representation Properties, so that the "Occurs Count Kind" property appears.

Company (Element)		()
<type filter="" text=""></type>	📑 🛼 🗙 💥 🖽	
Property	Value	?
Comment S		
General		
Content		
Occurrences		
Min Occurs S	昂 1	
Max Occurs S	unbounded	
Occurs Count Kind	expression	
Floating	퉘 no	
🕀 Alignment		
Delimiters		
Initiator	퉘 Company[
	暑]%CR;%LF;	
Empty Value Delimiter	r 唱 initiator	

28. Expand the "Occurs Count Kind" property to show the "Occurs Count" property.

Leave the field empty and save your XSD by pressing Ctrl+S or File->S.

🔲 Representation Prope 🛛 📙 Asserts and Discrimi 🎽								
Company (Element)	0							
<type filter="" text=""></type>	× 🔌 🛃 🖽 🖻							
Property	Value 🕜 🔺							
Byte Order	🛃 <dynamically set=""> 🛛 🔜</dynamically>							
Ignore Case	R no							
Fill Byte	昂の							
 Content 								
Length Kind	🛃 delimited 📃							
🖃 🔇 Occurrences								
Min Occurs 📓	1 1							
Max Occurs 📓	unbounded							
🕞 🤪 Occure Count Kind	expression							
😣 Occurs Count	<unset></unset>							
Eloating								
 Alignment 								
Alignment								
 Sample Test Data 								

When saving, the DFDL Editor also validates the schema file.

29. Note that an error icon has appeared next to the Company element and 'Occurrences'.

0	mpanies.;	xsd 🔀									
	E	6		4		<u> </u>		÷.			
Test	Parse Moo	del Test Serialize Model Hide	e properties	Show basic	Show all	sections Show	all content in sect	ion Show quick outli	ine Create logical instance	_	·
	Name		Т	ype M	in Occurs	Max Occurs	Default Value	Sample Value		_	🔲 Representa
		e Companies									Company (Ele
		sequence		1		1					
		🖃 e Header		1		1					<type filter<="" td=""></type>
		🗄 🚥 sequel 📣		1		1					Property
	0	🖃 🐙 Company 🗡		1		unbounded					В
	CTDUIS	2005 - When Jacque CountVind	ia 'augua ai	DEDL ever	antes la antes	t na Caunchi anu ak bu	, sek Element, #	and/lashers=Elements	Companies/humau/0/madaluses	u com co /n public	JI I(
	CIDVIZ	Companywant	is expressi	ang 1	ierty ottu		a set. Element: #x	scutyschemaciements		uence/parco	
I –		🗄 🖻 Employee		1		unbounded					- Cont
		🖃 🖻 Trailer		1		1					
		🖃 🚥 sequence		1		1					N S S S S S S S S S S S S S S S S S S S
L		e chksum	s	tring 1		1		trailer_value1		-	Sample Te
										- F	, sample re

Hover over the icon to display the error description. It states that the Occurs Count property can't be empty.

30. Click the Problems tab.

🔲 Properties 🛞 Problems 🕱 🛛 🖽 Deployment Log 💂 Console
1 error, 31 warnings, 0 others
Description A
Errors (1 item)
Q CTDV1200E : When 'occursCountKind' is 'expression', DFDL property 'occursCount' must be set. Element: #xscd(/schemaElement::Companies/type::0/model::sequence/particle::*[2]).
T A Warrings (31 items)

Double-click the error and the representation property of the problematic element will open.

🔲 Representation Prope	Asserts and Discrimi *1
Compan y (Element)	0
<type filter="" text=""></type>	× 💥 且 🗉 🖻
Property	Value (?)
Comment S	
🛨 General	
Content	
🖃 🔕 Occurrences	
Min Occurs 📓	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Max Occurs 📓	unbounded
🖃 🚳 Occurs Coupt Kind	expression
😣 Occurs Count	<unset></unset>
Floating	昂 no
Alignment	
Delimiters	

Click the button (three dots) next to the Occurs Count property.

31. A message bubble will appear. Check "Do not display this message again" and close it by clicking on the "X".



32. In the XPath Expression Builder window, expand Companies and the Header element and double-click the CompanyCount element.

Click Finish.

DXPath Expression Builder			_ 🗆 🗵
XPath Expression Builder Select the target from the Schema viewer, Functio below.	n viewer or Operator viewer and drag and drop t	ne nodes in the source viewer	55
Data Types Viewer	XPath Functions	Operators	
Companies Header Generative RecordDescription : string Generative CompanyCount : integer Generative CompanyCount : integer Generative Company [1n] Generative	ESy String E-Sy Boolean E-Sy Boolean D-Sy Boolean NodeSet E-M Axes	/ and eq ne lt le gt gt ge or + 	
Show XML Schema groups	,	JL i saka	
XPath Expression /Companies/Header/CompanyCount Namespace settings			*
?		Finish	Cancel

This will indicate that the number of occurrences of the Company element is dictated by the CompanyCount element in the Header.

Save the schema to clear the error.

33. Finally, the input file may, or may not, have a Carriage Return Line Feed as the last character. In some cases, the last record may be missing the final "new line" character.

To handle this situation, we will change the default property values for this model so that it will be able to handle both scenarios (ie. it will parse successfully, irrespective of whether the final character is present or not).

In the editor, collapse the Companies model, and then click "Show all sections".

	E	E			A		- 		[
Test P	arse Model	Test Serialize Model	Hide p	roperties	Show all sections	Focus on selecte	Show quick of a show quick quick of a show	outline	Create log
⊧s	chema								
<mark>▼M</mark> Am	essages essage is a g	夏日 日本 Global element that mo	。 odels an	🗶 🗳 entire docu	Linent of data.	8			
[Name		Туре	Min Occurs	Max Occurs	Default Value	Sample Value		
[🗆 e (Companies							
		•• sequence		1	1				
	1	🗉 e Header		1	1				
	1	🗄 📌 Company		1	unbounded				
		🗉 🥑 Trailer		1	1				
	Add a Local	Element							

34. To make the display a little less busy, click "Hide empty sections".

	E,	E		à		Ë	-		
Test F	Parse Model	Test Serialize Model	Hide propertie	 Hide empty sections 	^F ocus on selec	ted Show qui	ick outline	Create l	
۶	chema								
▼Messages Image: I									
	Name		Type Min Occ	urs Max Occurs 2	Default Value	Sample Value			
	= e (Companies							
		••• sequence	1	1					
	1	🗄 🖻 Header	1	1					
	1	🗄 📌 Company	1	unbounded					
	1	🗄 🖻 Trailer	1	1					
	Add a Loca	Element							

35. Expand the Data Formats section.

Highlight the <default format> field. This is where you can define many default property values for the message model.

In the Representation Properties, expand the Delimiters section, and locate the property DocumentFinalTerminatorCanBeMissing. Set this property to "yes". Ensure you press the Return key to ensure the property is correctly updated.

0 Companies.xsd 🛛		
Test Parse Model Test Serialize Model Hide properties Show basic S	Berreceptation Properties	logical instance
▶Schema ▶Messages (1 message) A message is a global element that models an entire document of data.	<pre></pre> <default format=""> (Data Format) > Sample Test Data Property</default>	
🕶 Data Formats 🛛 🛺 🚂 🕱	Comment S	Value
A data format is a container of DEDL properties.	T General	
Name Type	Text Content	
<pre><default format=""> Definition Format</default></pre>	Binary Content	
▶¥ariables (4 variables)	Occurrences	
A variable holds a value that can be used in DFDL expressions.		
	Delimiters	
	Separator	昂,
	Separator Policy	🛃 suppressed
	Separator Position	R infix
	Initiator	🛃 <no initiator=""></no>
	Terminator	🛃 <no terminator=""></no>
	Document Final Terminator Can Be Missing	yes
	Nil Value Delimiter Policy	🔁 initiator
	Empty Value Delimiter Policy	🛃 initiator
	Output New Line	點 %CR;%LF;
	Calculated Values	

36. Press Ctrl+S or File->Save to save the schema.

Check that the error has gone and the Problems view is clean.

4. Testing the Message Model

1. Now that the Message Model is complete, you will test it against a delimited file.

Click the Test Parse Model icon.

	Test F	Parse Model	Fest Serialize Model	Hide properties	Arrian Hide empty sections	Focus on sele	E cted Show qui e	koutline Crea	ate l
	15	chema							-
	▼M A m	lessages nessage is a gl	同日 紀 企 obal element that mo	⊕ 💥 📑 odels an entire do	▶ E 0 cument of data.				-
l		Name		Type Min Occu	rs Max Occurs	Default Value	Sample Value		
l		🖃 e Co	ompanies						
l			sequence	1	1				
l		÷	🛚 e H 🛶	1	1				
l		÷ •	🛛 📌 Col. pany	1	unbounded				
		÷ •	e Trailer	1	1				
		Add a Local E	Element						

2. In the Parser Input section, select "Content from a data file" and click the Browse button.

🌐 Test Parse Model 📃	
Message Select message for testing. Mere	
Message name:* Companies	
Parser Input	
Select content to be parsed against schema.	
Content from 'DFDL Test - Serialize' view	
Content from a data file	
Input file name:*	
Specify runtime configuration.	
Runtime encoding options	
More	
Encoding (code page): UTF-8	
Floating point format: IEEE Non-Extended	
Byte order: O Little endian 💿 Big endian	
Runtime validation	
Validate data against schema More	
Restore Defaults	
	Ŀ
OK Cancel	

3. Check the "Select an input file from the file system" and browse to "C:\student10\MessageModeling\data" and select the "Companies.txt" file.

Click OK.

File Selection	<u>_ 🗆 X</u>
Select an input file:	
MessageModellingLibrary Dim D IBM defined Ibrary.descriptor	
Select an input file from the file system	
C:\student10\MessageModeling\data\Compani	owse
ОК С	Cancel

4. Leave all the default values and click OK.

🌐 Test Parse Mode	l de la companya de l	
Massage		4
Select message for	testing. More	
Message name:*	Companies	.
Parser Input		
Select content to b	e parsed against schema.	
C Content from 'D	OFDL Test - Serialize' view	
Content from a	data file	
Input file name:*	C: \student10 \MessageModeling \data \Companies.txt Browse	
Constitution and		
Specify runtime confi	iguration.	
Provide runtime val	ues for properties which have been configured in the model to be dynamically set.	
More		
Encoding (code pag	pe): UTF-8	J
Floating point form	at: IEEE Non-Extended	.
Byte order: C Liti	tle endian 💿 Big endian	
Runtime validation		
📃 Validate data a	gainst schema More	
Restore Defaults		-
	OK Car	ncel

5. At the prompt, confirm the perspective switch, by clicking Yes.



6. A message bubble with a "Parsing completed successfully" should appear.

Check the "Do not display this message again" and close it by clicking on the "X", or click anywhere on the test parse window.

0 Companies.xsd 23								- 0
Test Parse Model Test Serialize Model "Messages & & & & & & & & & & & & & & & & & & &	l Show properties □ ↔ 兆 Ei models an entire do	Show all sections Focus on selected Show qu Eq cument of data.	년 ack outline Create logical in:	tance				
Name	Type Min Occu	rs Max Occurs Default Value Sample Val	8				_ 🗆 🗙	
Companies			DFDL Test - Logical Insta	nce 23		5	8 - 0	
··· sequence	1	1	Data councer (From DE	V Test - Parcel views				
E Header	1	1	Data source. stront on	AL TEST - POLGE VIEW A				
: 🗈 🐙 Company	1	unbounded	Message: Companies (/w	orkspaces/735/Message/	4odellingLibrary/Con	panies.xsd)		
: e Traler	1	1						
Add a Local Element			Tree View XML View					
			Name	Type	Value			
Data Formats (1 format)			Companies					
A data format is a container of DFDI	L properties.		E Company					-
			Company					
Variables (4 variables)			Company Company					
A variable holds a value that can be	used in DFDL expre	essions.	E Company					
			Trailer					
St. Navigator 2 Problems R. DFDL	Test - Parse 🔀	없 DFDL Test - Serialize ① DFDL Test - Trace of physical input data and selected message, arx			 Parsing con Tips: Selecting an ele The view menu To view the log To view the transmission 	mpleted successfully ement in the DFDL editor on the view toolbar pro ical instance that was or ce captured while runnir	will cause the pa vides options to o reated by the DFD ng the DFDL parsi	33 read input to floas only on data pertaining to the selected element. unter how the data and adjusted in the view. Click the arrow can on the tooblar or <u>terms</u> to open the menu. 2, a perior, dick to Boen (TPL Logical Instinuer, View tooblar button, or did <u>terms</u>), or did the Goen (TPL Terms View tobab button) or did t <u>erms</u> .
Status: Parsing completed: Mon Mar 2	23 15:02:22 GMT 20	15						
Input					Do not displa	y this message again		
Data: [Cit/student10/MessageModeln Parsed Input Characters 1 Header{recDesc:1 2 Company [compNam 3 Employee (empNum	ng\data\Companies My Company e=BBC =111111 de	txt records ,compCount: 5 <mark>} pt=500]empName=Alice Wong</mark>	Browse Addr: 8200 Ward	Encoding (code page): en Ave, "Markho	um-s		Message: Compa	of sale 135599.95)

7. Review the DFDL Test - Parse and the Logical Instance views to verify the parsing was correct.

۲							
🖬 DFDL Test - Logical Instance	□ i DFDL Test - Logical Instance 🛛						
Data source: <from 'dedlt<="" td=""><td>'est - Parse' vier</td><td>M.S.</td><td></td><td></td></from>	'est - Parse' vier	M.S.					
Message: Companies (/work	spaces/735/Mes	sageModellingLibrary/Com	panies.xsd)				
Tree View XML View							
Name	Туре	Value					
Companies							
Header							
RecordDescription	xs:string	My Company rec					
CompanyCount	xs:integer	5					
Company							
CompanyName	xs:string	BBC					
 Employee 							
EmpNo	xs:integer	111111					
Dept	xs:integer	500					
EmpName	xs:string	Alice Wong					
Address							
Tel	xs:string	905-347-5649					
Salary	xs:decimal	135599.95					
Employee							
Employee							
Employee							
Employee							
Company							
Company							
Company							
Company							
Trailer							
ChkSum	xs:string	1234567890					
1							

5. Establishing repeating elements by parsing

IIB V9.0.0.2 introduced the support for the DFDL facilities to enable automatic detection of repeating elements. This is provided with the "Occurs Count Kind" property. This support is enabled when this property is set to "parsed".

As a reference, the following table summarises the different values that the "Occurs Count Kind" property can take, and the meaning of each value. Note that the corresponding DFDL property name is occursCountKind.

occursCountKind	Meaning	minOccurs and maxOccurs used				
value						
fixed	count given by maxOccurs	To provide count (minOccurs must equal maxOccurs)				
expression	count given by element in data	For validation only				
implicit	count bounded by minOccurs and maxOccurs	To bound count				
parsed	count unbounded	For validation only				

1. The Companies.xsd model has been defined to use the "Occurs Count Kind=expression" for the Company element. The value of the property is obtained from the CompanyCount element in the Header record.

Companies.xsd										- 8
Test Parse Model Test Serialize Model Hide pro	perties Sh	all sections	Focus on selec	ted Show quick	outline Create lo	Digical i	instance			
*Schema							Representation Properties	serts and Discriminators		
Massagar		2				-	(The section 1)			2
A margane is a clobal element that models as a		U ant of data					Company (Element)			
A message is a global element that models an e	nure docum	ent of data.					<type filter="" text=""></type>	李易	× 🖗 🗉	
Name	Type	Min Occurs	Max Occurs	Default Value	Sample Value		Property	Value		(2)
E Companies							Comment S			
		1	1				General			
i De Header		1	1				Content			
		-	1 mbaunded				Occurrences			
E gel company	_	1	1 IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII				Min Occurs S	易 1		
A Sequence	abian	1	4				Max Occurs S	unbounded		
e CompanyiName	string	1	1		a		Occurs Count Kind	expression		
e Employee	_	1	unbounded				Floating	昂 no		
: ± e Iraler		1	1				🗄 Alignment			
Add a Local Element							 Delimiters 			
							Initiator	🛃 Company[
Data Formats (1 format)						_	Terminator	R]%CR;%LF;		
A data format is a container of DFDL properties	s.						Empty Value Delimiter Policy	🛼 initiator		
NV - 11 - 74 11 - N							Output New Line	暑 %CR;%LF;		
Variables (4 Variables)						- 1				
A variable holds a value that can be used in DF	DL expressio	ms.								
						-	1			
I					•	2	Sample Test Data			

2. Change the Occurs Count Kind property to "parsed".

This value means that the DFDL parser will keep trying to parse Company records until it gets a failure, at which point it will assume it has found all the Company records and move on to the Trailer record.

In this case, it is no longer necessary to specify the number of records with the CompanyCount element of the header record.

Save the updated model.

Representation Properties E Asserts and Discriminators						
Company (Element)						
<type filter="" text=""></type>	📑 🔜 🗱 🗱 🖬 🖬 🖬					
Property	Value (?)					
Comment S						
General						
Content						
Occurrences						
Min Occurs S	暑 1					
Max Occurs S	unbounded					
Occurs Count Kind	parsed					
Floating	暑 no					
Alignment						
Delimiters						
Initiator	Pa Company[
	暑]%CR;%LF;					
Empty Value Delimiter Policy	뿸 initiator					
Output New Line	鼎 %CR;%LF;					

3. Test the updated model.

Click Test Parse Model.

In the dialogue, select the file c:\student10\MessageModeling\data\Companies - lots.txt.

This file has more company records that the earlier input file. However, the company record count has been left unchanged, at 5, which does not match the number of company records in this new file.

🌐 Test Parse Model 📃 🗖	×
Message	_
Select message for testing. More	
Message name:* Companies	
Parser Input	
Select content to be parsed against schema.	
O Content from 'DFDL Test - Serialize' view	
Content from a data file	
Input file name:* C:\student10\MessageModeling\data\Companies - lots.txt Browse	
	μ.
Specify runtime configuration. Runtime encoding options Provide runtime values for properties which have been configured in the model to be dynamically set. More Encoding (code page): UTF-8 Floating point format: IEEE Non-Extended	
Byte order: O Little endian 💿 Big endian	
Runtime validation Validate data against schema More Restore Defaults	
OK Cancel	

4. Click OK to invoke the Test Parser.

The new file will be parsed, and all records will be successfully displayed, even though the CompanyCount element still has the value 5.

The screen capture below shows the parsed infoset (top right pane) with all Company records.

The Test Parse pane (bottom) shows the full details of all parser records. Note the value of CompanyCount (compCount) is still 5.

Companies.xsd 23			- 8	🖬 DFDL Test - Logical Instan	e X		<u> </u>
Test Parse Model Test Serialize Model Show properties Show all sections F	iocus on selected Show quick outline Create logical ins	tance	-	Data source: <from dfdl<br="">Message: Companies (/wor</from>	Test - Parse' view kspaces/735/Mes	/> sageModellingLibrary/Compa	nies.xsd)
Pressues (a) (b) (b) (b) (c) (ax Occurs Default Value Sample Value Bounded Bounded		_	Tree Verv N44. Verv Name Sompany Company Comp	Type xs:string xs:integer xs:integer xs:string xs:string xs:string	Value Comer Store 100001 4456 Captan Flack 905-347-5649 12245.95	•
Problems B. DFD. Test - Parse 23 Br DFD. Test - Serial:	20 DEDL Test - Trace			F Employee		0	·
DDV: Test-Pare : Mark the DV: Dove the Mark to be adverted by the DV: Test-Pare : Mark the DV:	In the part of the interpart of the logical instance o	view with the result of the parse.	×	Message: Companies (Messa	geModelingLibrar	y/Companies.xsd)	
Transition Headen (pac)base:by Company records.com 2 Employee (empNum=11111/dept=500 empNu 2 Employee (empNum=222221 dept=500 empNu 2 Employee (empNum=222221 dept=500 empNu 2 Employee (empNum=2233) dept=310 empNu 2 Employee (empNum=2333) dept=310 empNu 2 Employee (empNum=25555) dept=650 empNu 2 Employee (empNum=2555) dept=650 empNum=2555 2 Employee (empNum=25555) dept=6500 empNum=25555 2 Employee (empNum=255555) dept=6500 empNum=25555 2 Employee (empNum=255555) dept=6500 empNum=255555 2 Employee (empNum=25555555555555) dept=6500 empNum=2555555555555555555555555555555555555	pCount:5] ame=Alice Wong Addr:8200 Ward ame=James May Addr:23 The Cut ame=Richard Hammon Addr:16 & ame=Jaremy Clarkeson Addr:4 ame=Humphrey Littleton Addr:4	en Ave, "Markham, Ont" L3G H tings Chatham, CH2 2PR [el] reat Windmill St.London, W2 se Cottage, Pea br. Gloudon, JW1 16 Regent Street London, JW1	7 tel= 905- 208-203-133 RJ tel= 207 er_GL01 2NN 1QT tel= 20	347-5649)sal =135 2 sal =6189599.95 -445-2955 sal =6 4 tel =743-123-45 7-883-1238 sal =9	599.95 <mark>)</mark> 9.95) 67 sal= 55 9999.95 <mark>)</mark>	99.95)	4 >
Selection in DFDL Editor Selected: Companies : <anonymous> (complex) Repeating index:</anonymous>	Range in parsed input: 0 - 4618 Row: 0 Column: 0	In Input Byte Selection In Input Offset: 0 Length: 0					

5. Take a quick look at the DFDL Test - Trace tab.

Near the bottom of the trace, you will see how the parser has determined that it has found the final Company element.

First, during processing of the 10th Company element, it looks for an Employee element. Since there are no more Employee elements, the parser determines this is not available, and tries to find a new Company element.

```
info: Offset: 4589. Starting to process element 'Employee'.
[dfdl = /MessageModelling_TDS/Companies.xsd, scd = #xscd(/schemaElement::Company/type::0/model::sequence/schemaElement::Employee), 61]
info: Offset: 4589. Did not find initiator for 'Employee'
[dfdl = /MessageModelling_TDS/Companies.xsd, scd = #xscd(/schemaElement::Company/type::0/model::sequence/schemaElement::Employee), 59]
info: Offset: 4589. Element 'Employee' is empty because the initiator was not found in the data stream.
[dfdl = /MessageModelling_TDS/Companies.xsd, scd = #xscd(/schemaElement::Company/type::0/model::sequence/schemaElement::Employee), 105]
error: CTDP3041E: Initiator 'Employee(' not found at offset '4,589' for element '/Companies[1]/Company[10]/Employee[6]'.
```

A little further down, it then tests for a new Company element. However, since it has processed the final Company element, the parser detects that no more are available (it could not find the initiator).

info: Offset: 4592. Optional element 'Company' encountered. The DFDL parser will return to this position if the e [dfdl = /MessageModelling_TDS/Companies.xsd, scd = #xscd(/schemaElement::Company), 156] info: Offset: 4592. Starting to process element 'Company'. [dfdl = /MessageModelling_TDS/Companies.xsd, scd = #xscd(/schemaElement::Company), 60] info: Offset: 4592. Did not find initiator for 'Company' [dfdl = /MessageModelling_TDS/Companies.xsd, scd = #xscd(/schemaElement::Company), 58] info: Offset: 4592. Element 'Company' is empty because the initiator was not found in the data stream. [dfdl = /MessageModelling_TDS/Companies.xsd, scd = #xscd(/schemaElement::Company), 104] error: CTDP3041E: Initiator 'Company[' not found at offset '4,592' for element '/Companies[1]/Company[11]'. So, finally, the parser decides that the 10th occurrence of Company is the last one available, and so processes the next element as a Trailer element. This is parsed successfully, using the Trailer initiator.

info: Offset: 4592. Parser was unable to resolve data on the current branch and will evaluate the next available b
[dfdl = /MessageModelling_TDS/Companies.xsd, scd = #xscd(/schemaElement::Companies/type::0/model::sequence), 216]

info: Offset: 4592. Occurrence '11' of element 'Company' was not found in the data. occursCountKind is 'parsed' so [dfdl = /MessageModelling_TDS/Companies.xsd, scd = #xscd(/schemaElement::Company), 171]

info: Offset: 4592. Starting to process element 'Trailer'. [dfdl = /MessageModelling_TDS/Companies.xsd, scd = #xscd(/schemaElement::Companies/type::0/model::sequence/schemaE

info: Offset: 4592. Found initiator 'Trailer{' for 'Trailer'
[dfdl = /MessageModelling_TDS/Companies.xsd, scd = #xscd(/schemaElement::Companies/type::0/model::sequence/schemaE

info: Offset: 4600. Starting to process element 'ChkSum'. [dfdl = /MessageModelling_TDS/Companies.xsd, scd = #xscd(/schemaElement::Companies/type::0/model::sequence/schemaE

info: Offset: 4600. Found initiator 'chksum:' for 'ChkSum' [dfdl = /MessageModelling_TDS/Companies.xsd, scd = #xscd(/schemaElement::Companies/type::0/model::sequence/schemaE

info: Offset: 4607. Found delimited value: '1234567890' for element 'ChkSum'. The delimiter was '}'.
[dfdl = /MessageModelling_TDS/Companies.xsd, scd = #xscd(/schemaElement::Companies/type::0/model::sequence/schemaE

6. Unordered sequences

Finally, you will examine the facilities for handling unordered sequences. This was also introduced in IIB Version 9.0.0.2

This facility will be demonstrated by switching the order of two elements in the Header record of the Companies.txt file, and by setting the appropriate property in the model to use "unordered".

1. Switch back to the Application Development perspective.

In the Companies.xsd model, expand the Header element, and highlight the "sequence" underneath Header (ie. the sequence referring to the two elements contained within Header).

In the Representation Properties (Content), observe that the Sequence Kind property is set to "ordered".

0 Company.xsd 0 *Companies.xsd 🛛									
Test Parse Model Test Serialize Model Hide proper	Les Show all s	ections Fo	us on sele	ected Show quick outline Create logica	linstance				
・Messages 夏日 日本 第二日 日本 第二日本 第二日本 第二日本 第二日本 第二日本 第二日	re document of d	lata.		Representation Properties (*)=	Variables E Asserts and Discriminators				
Name	Туре	Min Occurs	Max O	<type filter="" text=""></type>	📫 🛃 🗙 🔆 🖪				
e Companies				Property	Value				
🖃 🚥 sequence		1	1	🖃 General					
E e Header		1	1	Data Format Reference	<default format=""> 문급 <dynamically set=""> 문급 bigEndian 문급 no 문급 0</dynamically></default>				
		1	1	Encoding (code page)					
e RecordDescription	string	1	1 1	Byte Order					
e CompanyCount	integer			Ignore Case					
😑 🚥 sequence		1		Fill Byte					
E Company		1	unbour	Content					
E Trailer		1	1	Initiated Content	yes				
Add a Local Element				Sequence Kind	ordered				
				Occurrences					
				Min Occurs S	器 1				
				Max Occurs S	昂 1				
				Alignment					
				Delimiters					
					1				

2. Set the property to "unordered", and save the model.

Note that you are not changing the order of the elements in the model definition.

t Parse Model Test	Serialize Model Hide proper	ties Show a	All sections For	tus on sele	cted Show quick outline Create log					
Messages message is a global	驔 🤹 û 🕂 💥 element that models an entir	e document o	of data.		Representation Properties	(X)= Variables E Asserts and Dis				
Name		Туре	Min Occurs	Max O	Sector State St					
🖃 🥑 Compa	nies				Property	Value				
🖃 🚥 seq	uence		1	1	🖃 General					
: e	Header		1		Data Format Reference	<pre><default format=""></default></pre>				
	•••• sequence		1	1	Encoding (code page)	🛃 <dynamically set=""></dynamically>				
1	e RecordDescription	string	1	1	Byte Order	🛃 bigEndian				
1	integer	1	1	Ignore Case	昂 no					
	sequence		1	1	Fill Byte	. 0				
:	Company		1	unbour	Content					
: + e	-	1	1	Initiated Content	yes					
Add a Local Eleme	ent		-		Sequence Kind	unordered				
					Occurrences					
					Min Occurs S	<u> </u>				
					Max Occurs S	暑 1				
					🕀 Alignment					
					 Delimiters 					

3. Test the updated model again.

Click Test Parse Model.

In this case, select the file c:\student10\MessageModeling\data\Companies_lots_unordered.txt.

This file has a lot of company records. In addition, the elements in the Header record have been switched, so that the compCount element appears before the recDesc.

📗 Companies_lots_unordered.txt - Notepad
File Edit Formationew B
Header{compCount:0,recDesc:My Company records}
Employee(empNum=111111 dept=500 empName=Alice Wong Addr:8200 Warden Employee(empNum=222222 dept=500 empName=James May Addr:23 The Cuttir Employee(empNum=333333 dept=310 empName=Richard Hammond Addr:16 Grea Employee(empNum=444444 dept=230 empName=Jeremy Clarkeson Addr:"Rose Employee(empNum=555555 dept=650 empName=Humphrey Littleton Addr:416]
Test Parse Model
Message
Select message for testing. <u>More</u>
Message name:* Companies
Parser Input
Select content to be parsed against schema.
O Content from 'DFDL Test - Serialize' view
Content from a data file
Input file name:* C:\student10\MessageModeling\data\Companies_lots_unordered.txt Browse Browse
Specify runtime configuration. Runtime encoding options Provide runtime values for properties which have been configured in the model to be dynamically set. <u>More</u>
Encoding (code page): UTF-8
Floating point format: IEEE Non-Extended
Byte order: O Little endian 💿 Big endian
Runtime validation Image: Validate data against schema More
Restore Defaults
OK Cancel

Select OK.

4. You will see that the new file has been successfully parsed, even though the Header elements in the input message have been switched round.

Beneral Processes	Com	panies.xsd 23									- 8	🖬 DFDL Test - Logical Instan	ce 23		🔓 🖳 ° 🗆
Ter Fore Service Model Ter Service Model Show properties Show affectors Focus on selected Show adds under Crate bagain retarios									Data source: (From DED) Test - Parcel view >						
Heasener Image: Solution of the	Test Pa	Test Parce Model Test Service Model Show properties Show all sections Focus on selected Show outlk outline Create logical instance													
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Image: Processing of the Processing															
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Image: Comparison 1 Image: Compari		lame K	Type	Mn Occ	ours Max Occurs	Default Value	Sample Value					Permitipescriptio	n veretring	My Company rec	
Image: state in the state		🖃 📧 Companies										CompanyCount	xs:intener	0	
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Compary Company Server is a intervent of the server is a intervent of		😑 🖻 Header		1	1							CompanyName	xs:string	BBC	
Image: Company Complexes and the provide intermediate of the provide of the prov		Elen Zellente		1	1							 Employee 			
Compary Control of the second of the se		DecentDescription	atriaa				hand unless t					EmpNo	xs:integer	111111	
Construction response to the version of the second of the version of the ver	1 8	e Recorduescription	song	1	1		neao_value1					Dept	xs:integer	500	
iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii		CompanyCount	nteger	1	1		1					EmpName	xs:string	Alice Wong	
i iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii		🖃 🐙 Company		1	unbounded							Address			
Company fame and a sector framework of the sector		E sequence		1	1							Tel	xs:string	905-347-5649	
In Contract and a sector new of the sector hand a sector new of the sector new of the sector new of the sector hand a sec		e CompanyName	string	1	1		a					E Employee	xs:decimal	132289.92	
Compared Compared Section In DVL fails Compared Compared Section In DVL fails Compared Compared Compared Compared Compared Compared Compared Section In DVL fails Compared Co		TI Tail Employees			unhacendad						<u> </u>	E Employee			
Status (1) Rober (1) Protect Process (2) (1) Provided Processes (2) (1) Provided Research, and updates the logical restance into with the result of the parts. Status: Prove complete: View Ner 23 15:453 GH7 2015 Provide Research View Ner 23 15:45	•										•		1		-
The The These: The The Provide New 2015 is 14455 off 2015 The The These: The The Provide New 2015 is 4455 off 2015 The These: The These: The The Provide New 2015 is 4455 off 2015 The These: The The Provide New 2015 is 4455 off 2015 The These: The These: The These: The These 2016 is 4455 off 2015 The The The These 2016 is 4455 off 2015 The	% Navi	gator 🔝 Problems 🖳 DFDL Test - Parse 🖇	🕴 둼 DFC	L Test - Ser	rialize 🚯 DFDL Ter	it - Trace							O 🖣 🖬	i 🐚 🔍 🤣 📳	K 🛛 🗸 🗆 🗖
State: Parag conjekted How Mer 23 154453 GHT 2015 Parage Conjekted How Mer 2015 Parage Conjekted Conjekted	DEDI Te	st - Parse: Runs the DEDL parser with the pro	ovided phys	cal input da	ta and selected mer	sage, and undates t	the logical instance vi	ew with the result of the	Darse.						
bod Data Cybucht20/HessageHodeing (data Campanies, jots_prometed. bat Preser Data Derectors United to the second of the sec	Status:	Parsing completed: Mon Mar 23 15:44:55 GM	T 2015												
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Ouesters iHeaders(compfount \$0] recless(%) Company records) iHeaders(compfount \$0] recless(%) Company records) iHeaders(mail: 10, 10, 10, 10, 10, 10, 10, 10, 10, 10,	Parser	Input													
1 Jisadar (compCount 20) recter 2W Company records 2 Dompany (compNue = 100 - 200 -	Char	acters													
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<pre>3 Employee (ampNum =111111/dopt 500) ampName Jaine Wong Addrs 2000 Warden Ave_ "Markhan, On "L38 H7/Eo1 =05-347-5649 ant 135599 e5] 4 Employee (ampNum =24222 dopt 500) ampName James None Wong Addrs 200 Warden Ave_ "Markhan, On "L38 H7/Eo1 =05-347-5649 ant 135599 e5] 5 Employee (ampNum =433333 dopt 1300 ampName James None None None None None None None None</pre>															
<pre>e Employee (amptum = 22222 dopt = 500 amptames James Kay[Addr:3 The Outlings_Chathes] (bit = 207-203-1323 [main = 109599.95] 5 Employee (amptum = 31333 dopt = 30) amptames Pictoria; 16 Greet Vindamill St.London, MX; 301 [bit = 207-415-295] fmain = 599, 95] 6 Employee (amptum = 51353 dopt = 30) amptames Pictoria; 16 Greet Vindamill St.London, MX; 301 [bit = 207-415-295] fmain = 599, 95] 7 Elower (amptum = 51353 (dopt = 30) amptames Pictoria; 16 Greet Vindamill St.London, MX; 101 [bit = 207-403-1234]; 123 [bit = 207-403-1234]; 123 [bit = 207-403-1234]; 123 [bit = 207-403-1234]; 124 [bit = 599, 95] 7 Elower (amptum = 51353 (dopt = 50) amptame Number (lintaria); 105 [bit = 100-403]; 101 [bit = 207-403-1234]; 1</pre>	3	3 Employee (employme 1111111dept=500 employme=Alice Warden Ave, "Markham, Ont", L36 1H7 tel=905-347-56491sal=135599.95													
s Employee (amplum = 433333 [dopt = 330] applame = Richard Hammool Addre 16 Greet Vindmill St. London JW 38.0] fool = 207-445-2955 [sol = 699.95] 6 Employee (amplum = 44444 dopt = 201 amplame = Richard Hammool Addre 16 Greet Vindmill St. London JW 38.0] fool = 207-445-2955 [sol = 699.95] 7 Employee (amplum = 455555 dopt = 650 smpName = Humphrey Littleton Addre 1416 Regent Street London JW 107[fool = 207-883-1238 sol = 99999.95] 9 Employee (amplum = 455555 dopt = 650 smpName = Humphrey Littleton Addre 1416 Regent Street London JW 107[fool = 207-883-1238 sol = 99999.95] 9 Education IOVL Edwards = Richard Street Range n parad repute 0-288 Raw 0 Column 0 Offset 0 Lengte 0	4 Employee (empNum=222222 dept=500 empName=James Mavi Addr 23 The Cuttings Chatham, CH2 2PR tel=208-203-1332 sal=6189599.95														
<pre>c Employee (ampNum +44444 [dopt=220] ampName-Jeremy Clarkeson [Addrs' Rose Octtage, Pee Dr"ucloucestor [dt.01 204([te] 743-123-4567] and =5595.95] 7 Employee (ampNum +555555 [dopt=650] ampName-Humphrey Littleton [Addrs' Hase Octtage, Pee Dr"ucloucestor [dt.01 204([te] 743-123-4567] and =5599.95] 6 Compared ForemName of TeM 7 Employee (ampNum +555555 [dopt=650] ampName-Humphrey Littleton [Addrs' Hase Octtage, Pee Dr"ucloucestor [dt.01 204([te] 743-123-4567] and =5599.95] 7 Employee (ampNum +555555 [dopt=650] ampName-Humphrey Littleton [Addrs' Hase Octtage, Pee Dr"ucloucestor [dt.01 204([te] 743-123-4567] and =99999.95] 7 Employee (ampNum +555555 [dopt=650] ampName-Humphrey Littleton [Addrs' Hase Octtage, Pee Dr"ucloucestor [dt.01 204([te] 743-123-4567] and =99999.95] 7 Employee (ampNum +555555 [dopt=650] ampName-Humphrey Littleton [Addrs' Hase Octtage, Pee Dr"ucloucestor [dt.01 204([te] 743-123-4567] and =99999.95] 7 Employee (ampNum +555555 [dopt=650] ampName-Humphrey Littleton [Addrs' Hase Octtage, Pee Dr"ucloucestor [dt.01 204([te] 743-123-4567] and =99999.95] 7 Employee (ampNum +555555 [dopt=650] ampName-Humphrey Littleton [Addrs' Hase Octtage, Pee Dr"ucloucestor [dt.01 100] [tel = 207-883-1238] and =99999.95] 7 Employee (ampNum +555555 [dopt=650] ampName-Humphrey Littleton [Addrs' Hase Octtage, Pee Dr"ucloucestor [dt.01 100] [tel = 207-883-1238] and =99999.95] 7 Employee (ampNum +5555555 [dopt=650] ampName-Humphrey [tel = 207-883-1238] ampNamp</pre>	5 Employee (empNum=333333] dept=310 empName=Richard Hammond Addr: 16 Great Windmill St.London W2 3RJ tel=207-445-2955 sal=599.95														
7 Employee (empNum = 55555) [dept=650] empName=Humphrey Littleton [Addr:416 Regent Street_London] NM1 107[tol = 207-883-1236 [sal = 99999.95]	6 Employee (empNum=444444 dept=230 empName=Jeremy Clarkeson Addr: "Rose Cottage, Pea Dr",Gloucester,GL01 2NM tel=743-123-4567 sal=5599.95)														
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