



## How to Draw DFD with Multiple Context Levels?

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Functional Decomposition is the process of taking a complex process and breaking it down into its smaller and simpler parts. Each of which can be broken down further. Once you've reached the lowest level of decomposed pieces of a subsystem, developers can think about how to start coding those functions. As you are working on the simplest functionality the developer can possibly work with the target system under developed. Therefore developing and testing those functionalities becomes much easier.

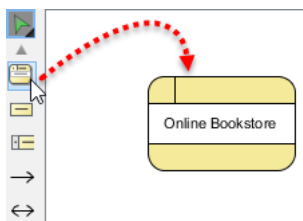
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In this tutorial, you will be creating a context level DFD and expanding the main process shape into the level 1 DFD.

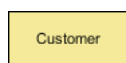
### Creating Context Level DFD

Context level DFD, also known as level 0 DFD, sees the whole system as a single process and emphasis the interaction between the system and external entities. Let's draw a context DFD.

1. To create a DFD, select **Diagram > New** from the toolbar.
2. In the **New Diagram** window, select *Data Flow Diagram* and click **Next**.
3. Enter *Context Diagram* as diagram name and click **OK** to confirm.
4. Name the diagram *Context Diagram*.
5. We need to create the main process. Drag *Process* from diagram toolbar to diagram. Name it *Online Bookstore*. We will use online bookstore as an example to show you how to create multiple levels DFD.



- As you can imagine, customers will be ordering books through the system. Therefore, add an **External Entity** to diagram and name it *Customer*. Like creating process, you can create an external entity by dragging **External Entity** from diagram toolbar to diagram.



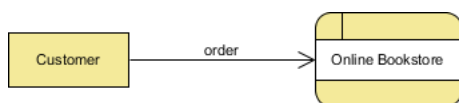
- A data flow is used to represent the movement of data between different parts of the system. In this case, "order" is a data created by customer and submitted into the system. Therefore, create a data flow from *Customer* to *Online Bookstore*. To do this, move the mouse pointer over **Customer**. Drag out the **Resource Catalog** button.



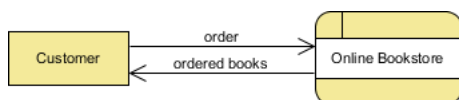
- Release the mouse button on *Online Bookstore* and select **Data Flow** from Resource Catalog. This creates a data flow connector.



- Name it *order*.



- The book store will finally deliver the books to the customer. Make use of the Resource Catalog to create a data flow from *Online Bookstore* to *Customer*. Name the flow *ordered books*.

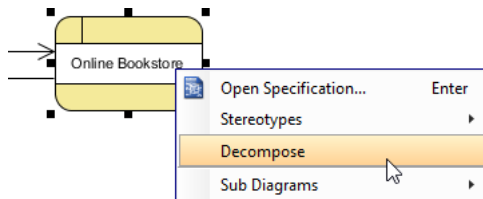


That's all for the context diagram. As we see the entire system as a single process, there is just one process shape created in this DFD level. In the next section you will decompose the *Online Bookstore* process and draw its detail.

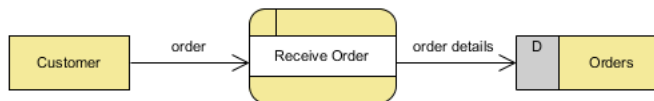
## Creating Level 1 DFD

In this section, you are going to draw the level 1 DFD to show the main functions of online bookstore.

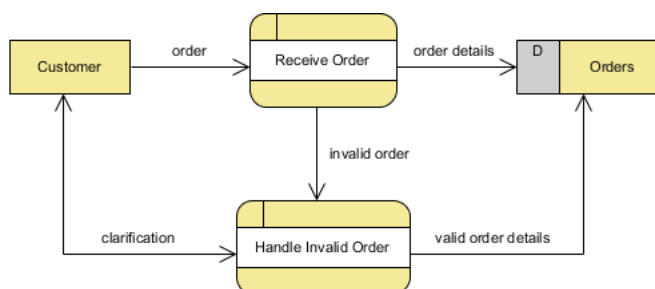
1. Right click on *Online Bookstore* and select **Decompose** from the popup menu.



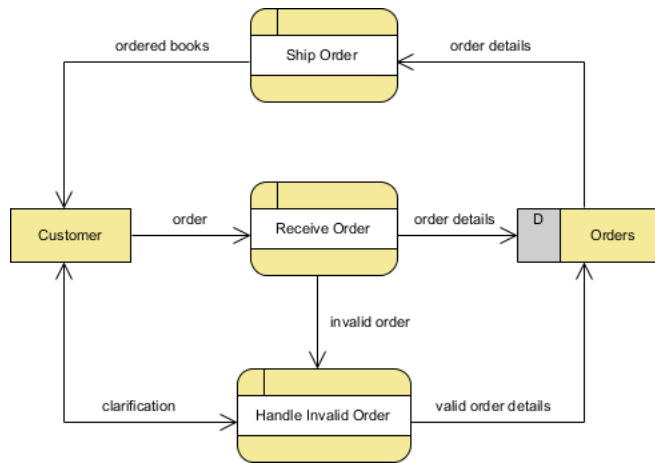
2. The data stores and/or external entities connected to the selected process would be referred to in the level 1 DFD. So when you are prompted to add them to the new diagram, click **Yes** to confirm. Note that the new DFD should look very similar to the context diagram initially. Every element should remain unchanged, except that the main process (from which this new DFD decomposes) is now gone and replaced by a blank space (to be elaborated).
3. Right click on the background of diagram and select **Rename...** from the popup menu. Name the diagram *Level 1 DFD*.
4. There is a process that receives customer order and store it into a database. Let's create a process *Receive Order* and a data store *Orders*. Add data flows in between.



5. When an order is invalid, there should be another process that involves contacting the customer and clarifying his/her need. Create a process *Handle Invalid Order*. Add suitable data flows between the shapes. Here you may use a bi-directional data flow to represent the a dialog flow.



- There is another process that handles shipment. Create the *Ship Order* process. Again, add appropriate data flows between the shapes.



That's all for this tutorial. Depending on the area of interest, you may create further levels to show the system in more detail. As you can imagine, the *Ship Order* process can be elaborated into smaller functional units (processes) like packaging, prepare invoice, arrange deliver, etc.

#### Resources

- [OnlineBookstore.vpp](https://www.visual-paradigm.com/tutorials/online-bookstore-vpp/)



[Visual Paradigm home page](https://www.visual-paradigm.com/)  
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