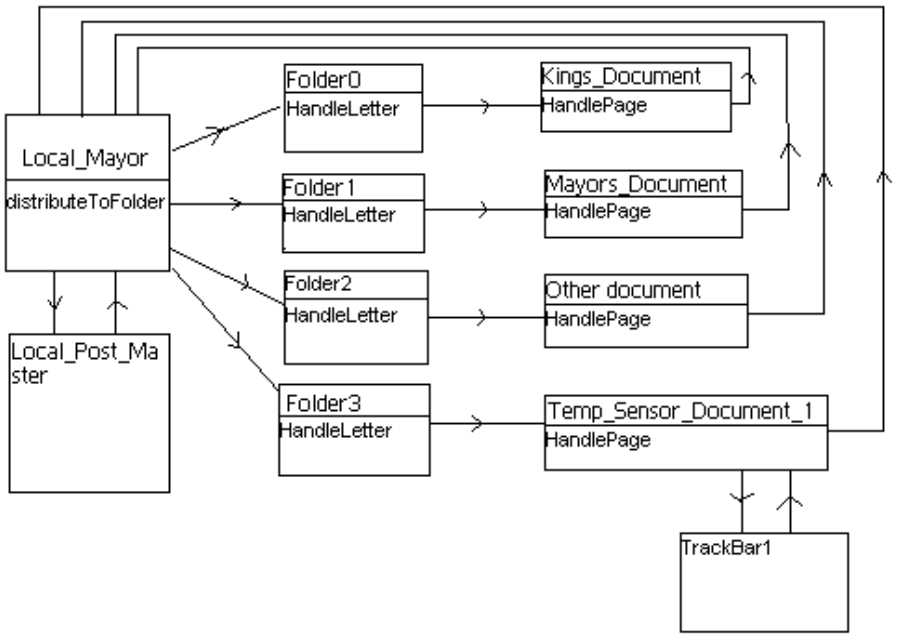
CAN Kingdom Demonstration Code

1 Introduction

The example code is meant as help for understanding the CAN Kingdom higher layer protocol. The classes defined have a correspondence in the CAN Kingdom simile. To get the best result from the example code it is recommended using the CAN Kingdom specification in parallel.

2 Structure

Figure 1 shows the general structure of the Code. The boxes represent objects and the lines represent pointers.



Class	Description
City	Derived from TForm. Contain all the other objects
Mayor	One in each City. Handles the Letter distribution. Keeps track of the current Action Mode etc.
PostMaster	One in each City. Handles All the communication with the bus. Keeps track of Communication Modes etc.
Folder	Four in this city. Links the Document to the Mayor.
DocumentList	Two in City, one receive- and one transmit list. Used to keep track of the Documents when not assigned to a Folder, etc
Document	A fusion of the Document forms, Page forms and bit or line forms. The Document class serves as a base class for all Documents. The different Documents contain most of the code that is not directly linked to the CAN Kingdom specific message handling (the Letter distribution).
MayorsDocument	Derived from the base class Document.
KingsDocument	Derived from the base class Document.
TempSensorDocument	Two in this City. Derived from the base class Document.

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TempShowDocument	Two in this City. Derived from the base class Document.
CKLetter	All the CAN messages are passed along in this format.

Example of a message distribution: The City, which in the code is derived from a form is alerted, through a window event, that a Letter (i.e. CAN message) is received. The Postmaster then will read the message in the receive buffer, and through the pointer to the Mayor place it in the Mayors distributeToFolder function. This function then will distribute it to the proper Document through a Folder.

1. Windows event to the TrackBar1. (OnTrackBarchange1)
2. TrackBar1::TrackBar1Change: Asks Temp_Sensor_Document_1 for the current Envelope in use.
3. TRackBar1::TrackBar1Change: Calls the Mayor's distributeToFolder function with an empty Letter in the Envelope in use.
4. Mayor::DistributeToFolder: Distributes the Letter to the proper Folder
5. Folder::HandleLetter: Calls the HandlePage function in the Document with the empty page, *if* the Envelope matches the Folder settings.
6. TempSensorDocument::HandlePage: Checks the position of ScrollBar1, generates a Page and places it in the right Envelope. Through the pointer to the Mayor, calls the PostMaster's TransmitMessage function.

This message route has the advantage that all transmissions and receptions are distributed through the Mayor distributeToFolder function. If, for example, a transmission from a Document is required, a call to this function with an empty Letter in the right Envelope will generate this. This can be done either as in the example above from a Sensor (the ScrollBar) or any other object that is connected to the Mayor and possesses the information about which Envelope the Document uses.
The handling also has a natural way of supporting the RTR quality of the CAN protocol. The RTR Message contains an empty Envelope. When the PostMaster receives such a message he simply calls the Mayor's distributeToFolder function as he does with all message receptions. This will result in the requested message being sent.

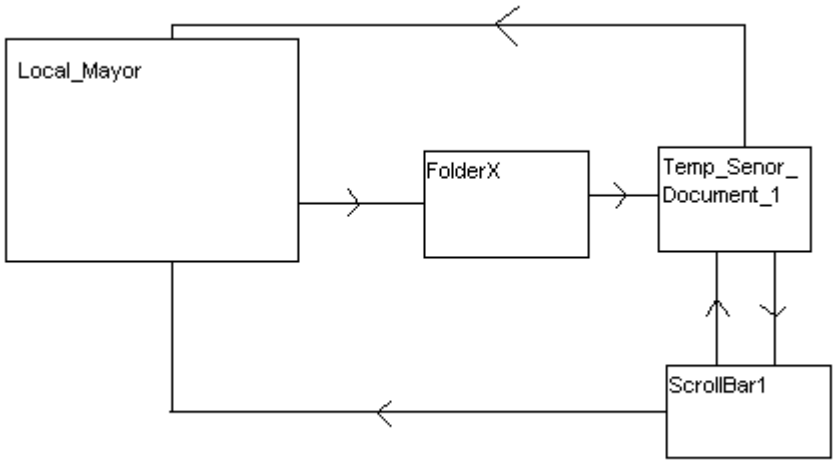

Figure 1: Pointer and class structure

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3 Restrictions on the CAN Kingdom specification

For simplicity the application has some restrictions on the CAN Kingdom specification. They are listed below.

1. Only the King's Pages 0-4 and 16 are implemented.
2. It is not possible to assign more than one Envelope to a Folder.
3. The Folders do *not* keep track of the DLC, the data length code. A buffer with a fixed length containing the Page is passed along with the different calls and the Documents uses as much of the buffer as required.
4. The application does not support Extended (29-bit) CAN frames.
5. You can't assign an Envelope to a Folder which doesn't contain a Document.

4 City specific definitions

4.1 Setup

After the setup is completed, the postmaster goes into Silent Mode and the Mayor freezes. The only way to interact with the city is through the King's Pages.

4.2 City Modes

There are no different city modes. Just one (which happens to be zero).

4.3 Action Modes

4.3.1 Freeze

The City does not send or receive any messages except for the King's Pages. It is still possible to use the King's Pages but the city will not respond until the mode is changed.

4.3.2 Reset

Folders are emptied and groups removed. The city will now be in the same mode as it was just after setup, waiting for a king's page.

5 Document lists

After setup the Documents are stored in Document lists according to the CAN Kingdom specification. The Document lists are basically Arrays of pointers and will only be accessed from the King's Document in order to assign a Document to a Folder.

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The Document list that the city provides the Kingdom founder with:

Transmit_Document_List[0]			
Document	RTR	Description	Fixed Folder number
0	Yes	Mayors_Document	1
1	Yes	Temp_Sensor_Document_1	No
2	Yes	Temp_Sensor_Document_2	No

Receive_Document_List[0]			
Document	RTR	Description	Fixed Folder number
0	No	Kings_Document	0
1	No	Temp_Show_Document_1	No
2	No	Temp_Show_Document_2	No

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