

Introduction to Game Programming and Robotics

Unit # 2

Acknowledgement

- Most of the example/material presented in this paper is taken from tutorials provided by Microsoft or from the book “Robot Development using Microsoft Robotics Developer Studio” by Kang, Chang, Gu and Chi.

Visual Programming Language

- The VPL is a new application development environment designed specifically to work with DSS services.
- Programs are defined graphically in data flow diagrams rather than the typical sequence of commands and instructions found in other programming languages.

First VPL Program: Hello World!



- **Connection Dialog:** This dialog enables a user to select which message is being output from the source and which message accepts the input in the destination activity.
 - From: DataValue
 - To: SayText
- **Data Connections Dialog:** This enables a user to map a particular data value in the message output from the source to a target value in the message input to the destination.
 - Value Box: Value
 - Target Box: SpeechText

First VPL Program: Hello World! (Cont'd)

- VPL automatically sends an input message to all top-level *Data* activities when the program starts.
- A *message* has one or more fields and each has a name and a type.
- When we specify values in the Data Connections dialog, we are actually selecting which field of the structure to send to a target value in the destination activity.

First VPL Program: Hello World! (Cont'd)



- Select the connection between the *Data* activity and the *TexttoSpeechTTS* activity. Change the *Value* property to *Length*.
- Now when we execute the diagram, the engine says 21.

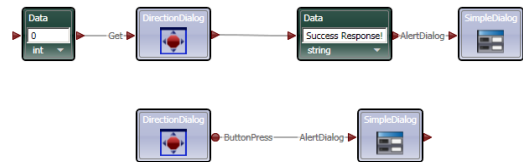
First VPL Program: Hello World! (Cont'd)

- In this example the *Data* activity builds a message that contains a value, which is a string and a value associated with the string, which is its length.
- This message is sent to the *TexttoSpeechTTS* activity. When the *TexttoSpeechTTS* activity receives a message on its *SayText* input pin, it speaks the text and then sends a success or failure message on its output pin.

Inputs, Outputs, and Notifications

- Each activity has one or more inputs and one or more outputs.
- When there are multiple inputs or outputs, only a single pin is shown and the desired input or output is selected with the Connections dialog when a connection is made.
- Some activities have an additional output called a *notification*.

Second VPL Program



- Between Data → DirectionDialog
 - From: DataValue
 - To: Get
- Between DirectionDialog → Data
 - From: Get-Success
 - To: Create
- Between Data → SimpleDialog
 - From: DataValue
 - To: AlertDialog
- Between DirectionDialog → SimpleDialog (Notification)
 - From: ButtonPress
 - To: Alert Dialog

Second VPL Program (Cont'd)

- When we drag onto the diagram an activity that is already presented, VPL asks us whether we want a completely new activity or just another reference to the existing activity.
- If we specify that we want a new activity, the new activity is given a different name than the original one.

List of Basic Activities

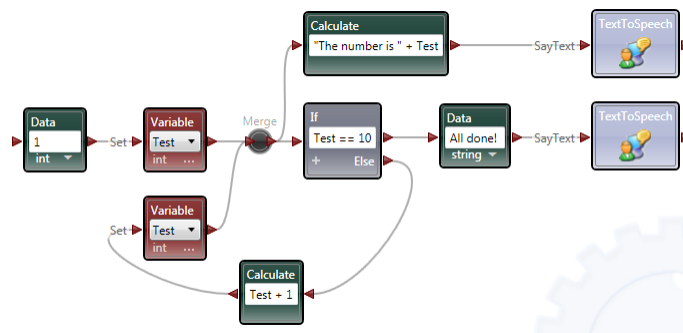
Activity	Description
Variable	This activity is used to get or set the value of a state variable.
Calculate	This activity is used to calculate a value from one or more inputs.
Data	This activity is used to define static data that is used as an input to another activity.
Join	This activity waits to send an output message until it has received a message on all of its inputs. (similar to AND gate)
Merge	This activity forwards a message to its output from any of its inputs. (similar to OR gate)
If	This activity forwards a message on the first output that has an expression that evaluates to <i>true</i> .
Switch	This activity forwards a message on the first output that matches the input value.
List	This activity holds a list of data.
List Functions	This activity performs various operations on a list of data.

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Third VPL Program (Incrementing a Value)

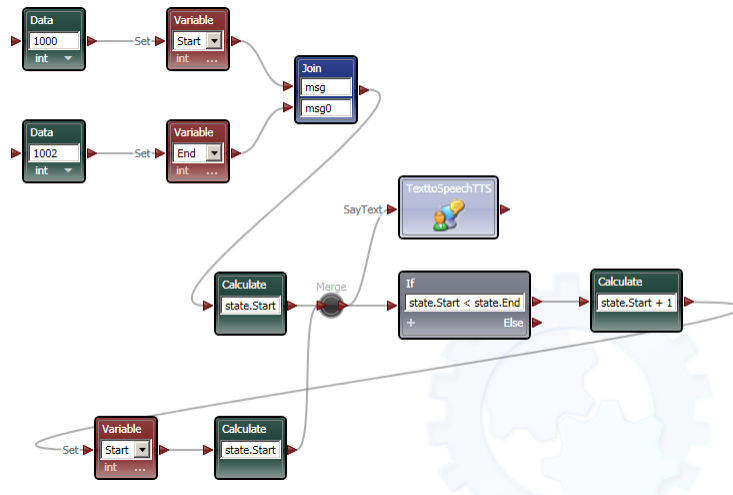


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Fourth VPL Program (Looping and Condition)

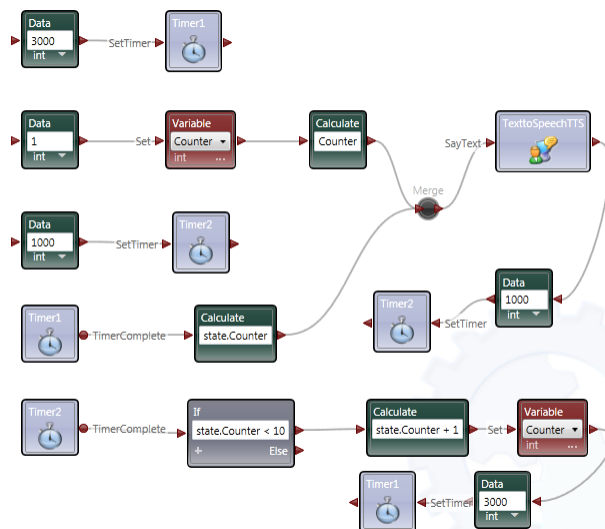


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Fifth VPL Program (Concurrent Program)



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