Visual Ada Developer

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Abstract:

Programming language popularity depends not only on its properties and quality, but also on service which the user gets in its environment. Gui and visual developer are important components of IDE (Integrated-Development Environment).

Visual Ada Developer (VAD) helps Ada programmers easily create OS independent application, using standard set of components, such as GUI elements, Multimedia elements, Network connections, DB connections and others.

Categories & Subject Descriptor:

D. SOFTWARE; D.1 PROGRAMMING TECHNIQUES
D.1.7 Visual Programming

General Terms: Design

Keywords: Ada-95, Gui, Ide , Tcl/Tk, Widget

1 Introduction

The development of visual programming systems today is the most dynamic and quickly developing part of tool software. It's the future of programming and today it is possible to speak of visual language as a new algorithm-programming meta-language, which operates with forms, properties, methods and events.
Visual developers should become as integral part of operating system as a various office systems are, for example QT 3.0 has Gui builder.

2 The Requirements to Ada Visual System

- maximum undisguised, opportunity to add new visual components and to change the existing. no static rc files. All widgets may be dynamically created, destroyed, removed and resized.

- maximum system-independence. All system functions should be latent by visual developer functions, so that it would be possible to realize application in various operating systems.

- the system should provide development applications in various areas of programming.

- scientific: to contain packages of the scientific subroutines for the important sections of mathematicians (differential equations, theory of probability, combinatorial and others);

- engineering: the engineering drawing, finite-differences methods, method of finite elements and others;

- multi-media: transformations of various graphic formats (image edition), animation, creation of the documents and information systems, support sound and video;

- various database systems support;

- client/server systems and networks: working with html and xml documents;

- real time applications.

The peculiarity of Ada visual system is language opportunities and a range of soluble problems.

It is desirable to include into system:

- a special real time debugger and timer-debugger for debugging multi-task applications with scaling of time, suspension of time in check points and step-by-step mode;

- a special distributed debugger for debugging distributed systems.

- an emulators of input/output ports and interruptions, generators for the test i/o operations and interruptions, a special absolute address data record programs through given time intervals to ensure reiteration of data and events at debugging real time systems and to check up survivability of system at a various sort failures.

3 VAD (Visual Ada Developer)

We have realized some of the formulated above requirements in Visual Ada Developer (VAD).

```
Main window
  Main menu panel
    File menu
      New Project Dialog
        Load New Project Dialog
      Open Project Dialog
        Load Open Project Dialog (*.gui files)
      Save Project button
        Save current project
      Save As Project Dialog
        Load SaveAs Dialog
      Exit button
        Close VAD
    Build menu (Mark needed components)
```
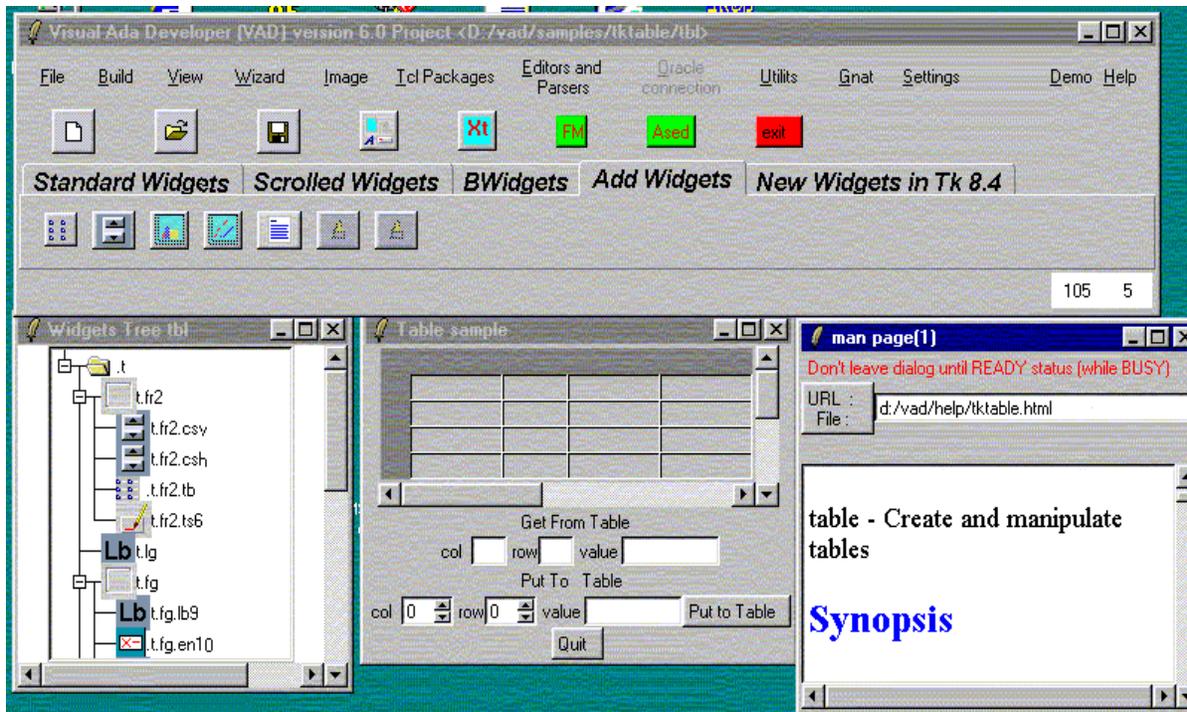
Figure 1. VAD 6.0

TCL Script Generate check button
  ADA Main Program Source Generate check button
ADA Init Package Specification Generate check button
ADA Init Package Body Generate check button
ADA Event Package Specification Generate check button
ADA Event Package Body Generate check button
Gui File Generate check button
Shell Script Project building check button
View menu
  Redraw button
    Redraw Project Form
  View Widgets tree button
    Load Window with Project Widget Tree
  Load Properties Inspector button
    As a role Properties Inspector is loaded automatic
       for selected Widget, but it
    may be closed and need to load it
Wizard menu
  Layout Wizard Form button
    Load Layout Wizard Form, which helps to build
      selected layout properties
  Widget Depended Options Form button
    Because TK widgets have many properties,
      fixed properties set and special
    addcreate property is available in Properties Inspector.
    Wizard helps   to build this property.
  Copy Properties From … Form button
    Load form to copy properties from existed
      widget to new

TCL Script menu
  Create Embedded Window Form button
    Load Form to create embedded window
      in Canvas or Text widget
  Configure Script Form button
    Load Form to build configure script
  Bind Script Form button
    Load Form to build bind command, if need to use
      event ,which is absent
    in events part of Properties Inspector or need to
      build virtual event
Image menu
  Image Builder Form button
    Before using image in widget it must be building
      from image file.
    Load Form to build image and add it to image table.
  Icons Builder Form button
    Load Icons collection to add needed to image table.
  Image Editor (TKpaint) load button
    Load Image Editor TKpaint
  Image Processor (XBit) load button
    Load Image Processor XBit
  Image Viewer (Whiteboard) load button
    Load Image Viewer Whiteboard
TCL packages menu
  Internal Supported TCL Packages include buttons
    Before using TCL package in VAD
      ,it must be loaded.
Editors and parsers menu

Text Editor (FVE) load button
Load FVE text editor with VAD packages help
HTML Editor (August) load button
Load HTML Editor AUGUST
XML Parser Form button
Load Form to parse XML document
XML Editor Form button
Load Form to parse and edit XML document
Corba Parser Form button
Load Form to translate IDL to ADA
Oracle connection menu (available only after Oratcl
package was loaded)
Logon Dialog button
Load Logon Dialog Form
Open Connection button
Open connection to Oracle DB
DB Navigator load button
Load Oracle DB Navigator
Close Connection button
Close Oracle Connection
Query Form button
Load SQL QUERY Dialog Form
Logoff button
Close Server Connection
Utils menu
Change Widgets Place Form button
Load Form to change two widgets by place
Move Widget Form button
New widget in Widgets tree is always last.
Load Form to move widget to new place.
Delete Widget Dialog button
Delete selected widget
Import Widgets from other project Form button
*Load Dialog Form to import part of other
project in current.*
Gnat menu
Settings Environment Variables Form button
Load Dialog Form to set GCC Environment Variable
Compile Form button
*Load Dialog Form to compile ADA or C(C++)
sources by GCC compiler*
Link (Build Executable) Form button
Load Dialog Form to build executable
Run button
Run Executable module
Settings menu
Settings VAD Form button
Demo button
Load Demo VAD Session
Help menu
Help Topics in HTML format

Hot buttons panel
New Project Dialog
Open Project Dialog
Save Dialog
Save As Dialog

Xterminal load button
Load Xterminal Emulator
ASED IDE load button
Load TCL ASED IDE

FM load button
Load File Manager

EXIT button

Component pallet panel
Standard Widgets pallet
Open Page with Standard Widgets
Scrolled Widgets pallet
Open Page with Scrolled Widgets
BWidgets pallet
Open Page with BWidgets
Add Widgets pallet
Open Page with Add Widgets
Tcl 8.4 Widgets pallet
Open Page with New Tcl /Tk 8.4 Widgets
Widgets panel
Widgets buttons for selected Widgets pallet
Status panel
*Show Layout script, Addcreate script, and Pointer
coordinates*

Properties Inspector
Widget Selection
Select Widget from Project Widgets Tree
Properties form
Fill Standard Widget Properties Form
Events form
Fill Widget Events Form
Add/Correct switch button
*To add Widget to Project or correct Widget, need to push
Add button*
Erase button
Erase selected Widget from Project Widget Tree

3.1 Common Description

VAD is a gui builder based on Tcl/Tk (tools command
language). It generates 100% Ada-95 system independent
software, that is portable to Windows, OS/2, UNIX (Linux)
and Mac. What you need is only to compile generated code on
the used platform. VAD is fully open system without black
boxes. It has only four functions for Ada - Tcl connection :

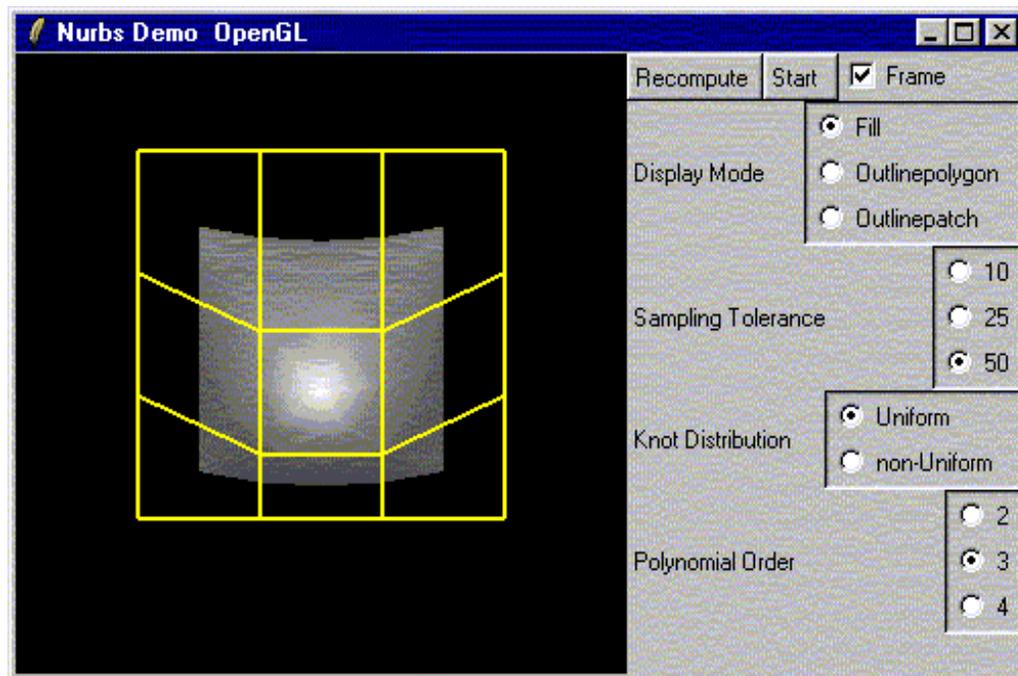|	
execute	- execute Tcl script;
command	- add Ada event handler to Tcl handlers list as a new Tcl command;
gettclvalue	- save a Tcl variable value in Ada variable;
getparametervalue	- save a Tcl command parameter (Ada event handler as a Tcl proc with parameters) into Ada variable.

Figure 2. OpenGL demo

3.2 What You May Do with VAD

- build an application based on standard widgets: toplevel frame button radiobutton checkbutton menubutton label entry listbox canvas message menu item scrollbox scale text spinbox panedwindow labelframe;

- use wide widgets collection (BWidgets): Button Label Entry Listbox ArrowButton ProgressBar MainFrame LabelFrame LabelEntry TitleFrame Dialog ScrolledWindow PanedWindow Buttonbox Notebook (page) Spinbox Tree MessageDLG ProgressDLG ScrollableFrame ScrollView PagesManager PasswdDLG;

- use Bryan Oakley widgets: combobox mclistbox;

- use direct executable Tcl script: tclscript;

- use widget from Tktable Package: table;

- use widgets from BLT package: graph barchart;

- use cscrollbar (scrollbar analog);

- use widget from Tkhtml package: html;

- use widget from Tkogl (Tom) package: OGLWin;

- use Scrolled Widgets: text canvas listbox mclistbox table html;

- use many of image formats such as: bmp, xbm, xpm, gif (with transparency), png, jpeg, tiff and postscript.

- use huge icon collection;

- generate adasource from image file by Martin C. Carlisle and Patrick Maes image generator (from RAPID);

- directly connect to oracle (or odbc) server, navigate on DB;

- use sound and video;

- create and edit text files.

- edit html files

- edit and parse xml documents

- translate IDL to Ada-95(CORBA)

- build HTML documents based help system.

- work with ftp

- reset system settings for GNAT Ada-95 compiler, compile Ada and C(C++) sources and build executable.

VAD generates a compact system, which consists of main program and two packages:

- Initialization widgets and handlers package;

- Empty Ada event handler's package.

- VTK (Visualization Tool Kit) package

3.3 High level graphic's support

VAD supports high level graphics by XBit package and OpenGL (Tkogl package or Tom packages).

3.4 Multimedia support

- VAD supports multimedia sound and video.

- Snack package supports all sound formats.

- XBit package supports MPEG movie (without sound), OpenGL and DirectX(Windows)

- QuickTimeTcl package supports Quick Time video in Windows and Mac
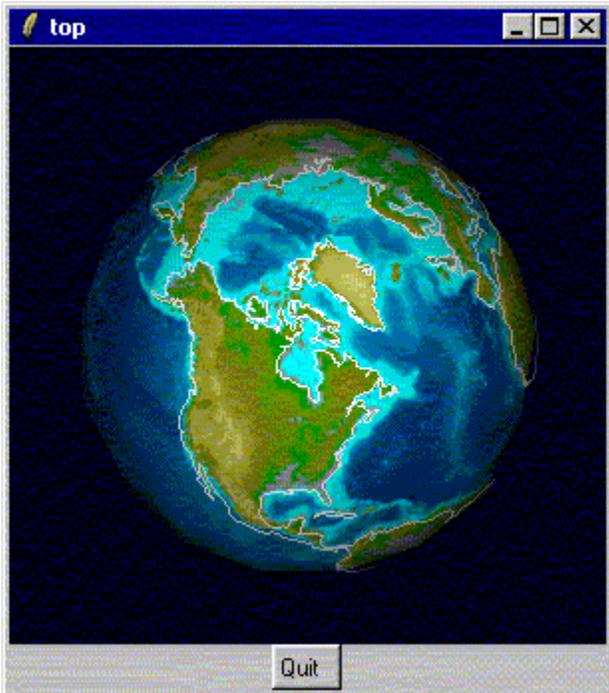
33

Figure 3. VTK demo

Figure 4. QuickTime demo.

- XanimTcl package supports Quick Time video and *.avi video in Unix.

VAD automatically loads needed package for Quick Time

4 Summaries and Future Work

With VAD you may build gui oriented application based on Tcl/Tk standard widget collection, BWidgets collection, oracle database support, odbc database support, animation, multimedia sound, ftp control and net common control , html browsing,xml parsing , idl to ada translation and so on.

In next VAD versions we plan to add new features :more powerful database support, expanded xml support, including Common Warehouse Metamodel (OMG CWM Standard)
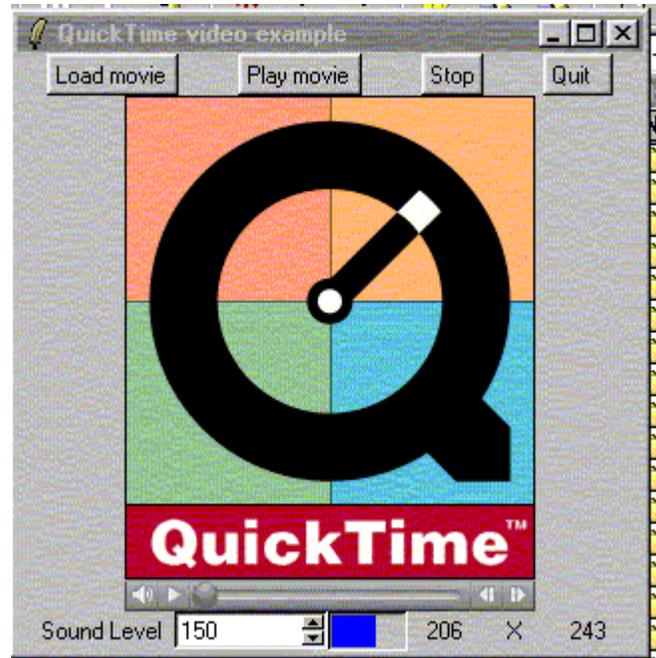
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