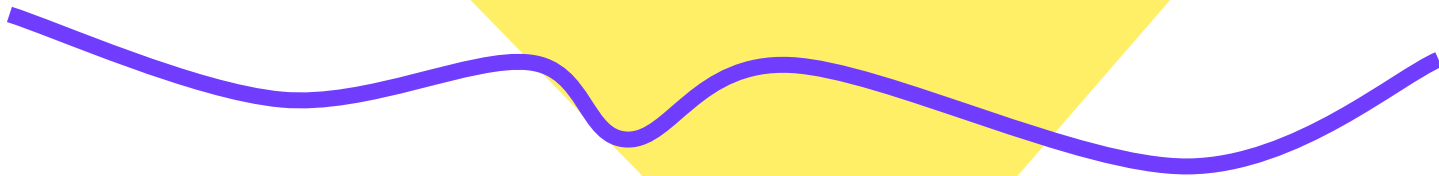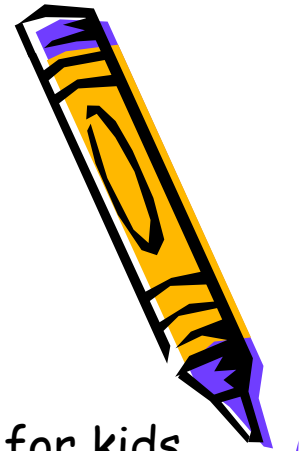# KPL

(Kids Programming Language)

Learning is Best
When Learning is Fun

Recent History

- Remember BASIC? How many of us started by coding **games**?!

- 20+ years since **LOGO**, the last widely available language designed for kids

- **2/3 decline** in US computer science enrollments in last 5 years !?!

- Modern programming IDEs have moved **far** beyond beginners

- There's **way** too much to learn before programming becomes fun

- Thus KPL: **educational freeware** that is easy, fun, fast, productive and international – with dozens of examples to play, learn from and tinker with

- KPL is a **2006 Consumer Product of the Year** finalist (significantly, Washington Software Alliance has no Educational Product category)
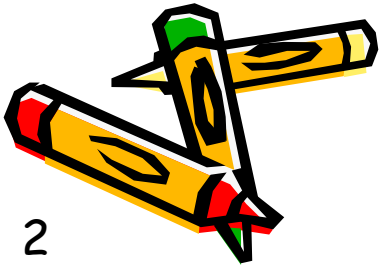
  - KPL has been downloaded over **45,000** times in the first 6 months – with **only** word-of-mouth marketing

KPL's Technology

KPL is built on the .NET Framework, leveraging CodeDOM objects – we have lots of requests for other platforms

KPL v 2 wraps Managed DirectX for easy 3D programming – OpenGL and IDX3D wrappers are obvious thoughts

KPL v 2 offers an open runtime architecture, allowing extension of the language with new functionality or alternative technologies

KPL's Language Design

- Readable and intuitive keywords
- Simple syntax
- Color-coded editor
- Strongly typed
- IntelliHelp and AutoComplete
- Procedural/modular programming
- Class-based programming in KPL v 2
- Easy to start, with lots of room to grow!
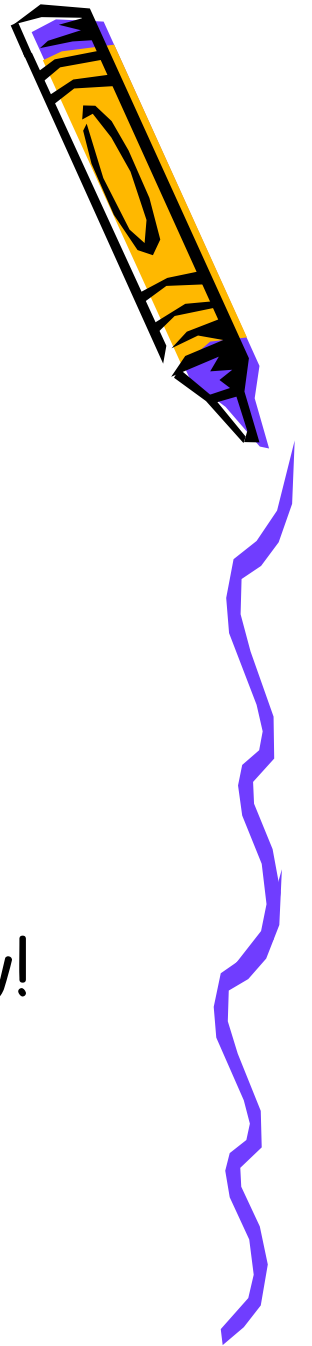
Immediate Gratification

- Fast fun results are best to capture and keep beginners' interest

- Graphics, animation and sounds are emphasized, and especially easy

- Feedback so far is **very** encouraging
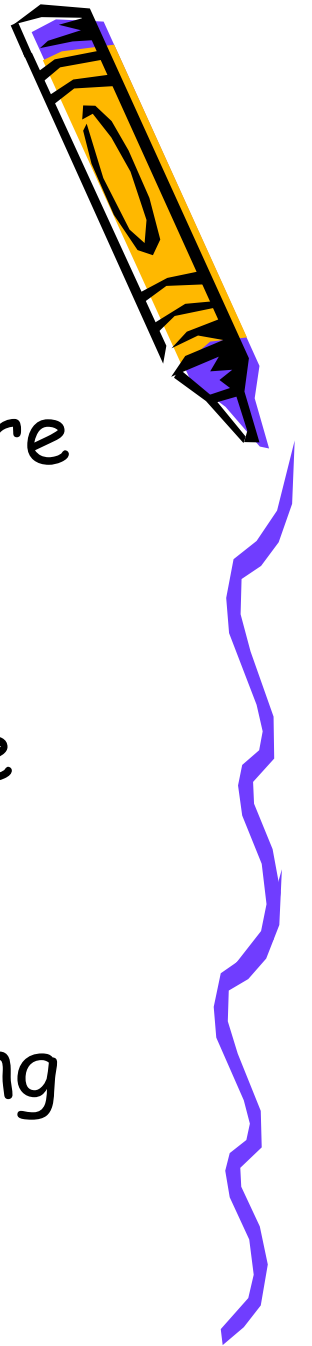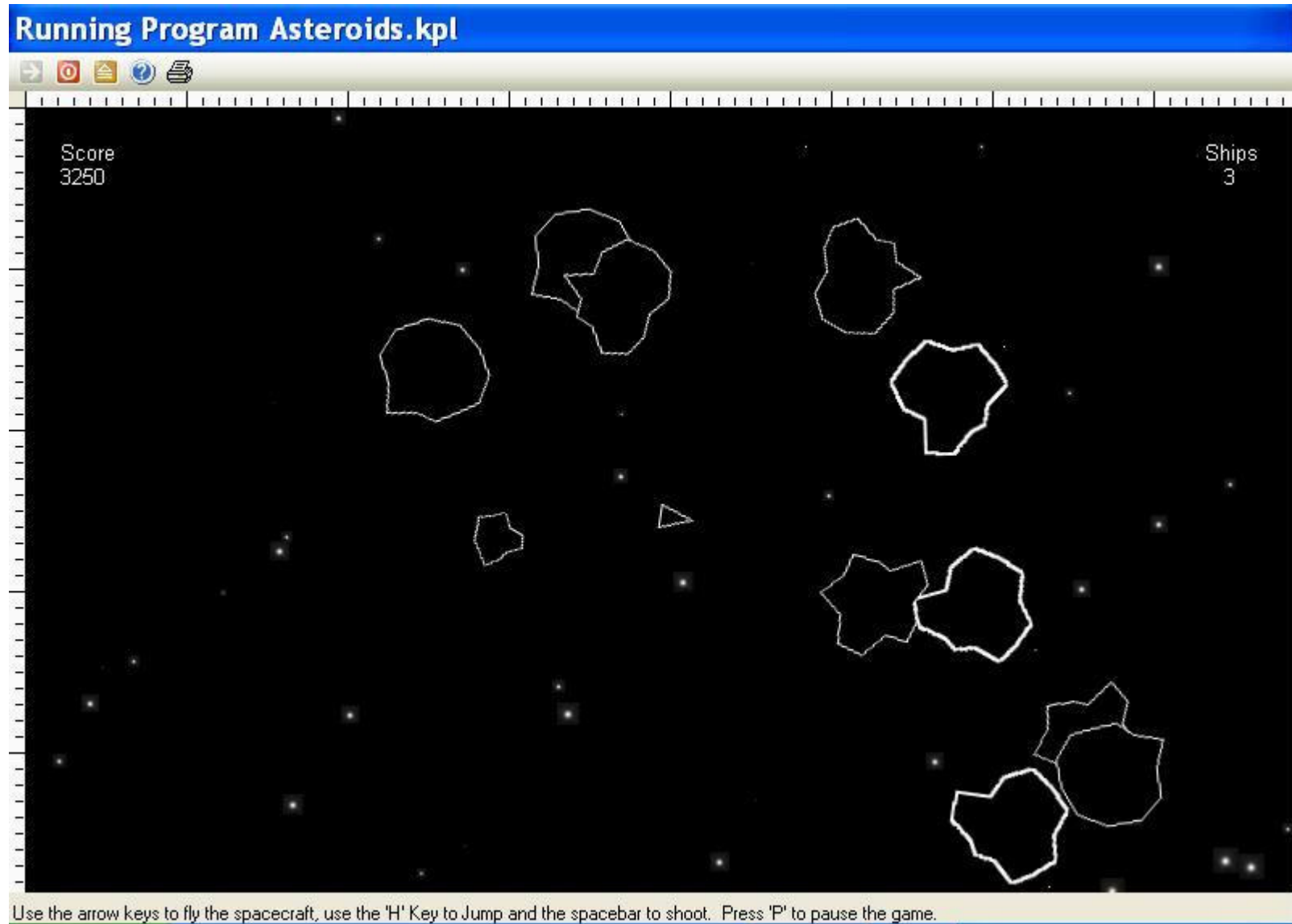
KPL-easy

```
1   Program UFO
2
3   Method Main()
4
5       LoadSprite( "UFO", "UFO.GIF" )
6       MoveSpriteToPoint( "UFO", 50, 0 )
7       ShowSprite( "UFO" )
8
9       Define ufoY As Int
10      For ufoY = 1 To 150
11          Delay(10)
12          MoveSpriteToPoint( "UFO", 50, ufoY )
13      Next
14
15  End Method
16
17  End Program
```

Running Prog...

KPL-classic

Running Program Asteroids.kpl

Score
3250

Ships
3

Use the arrow keys to fly the spacecraft, use the 'H' Key to Jump and the spacebar to shoot. Press 'P' to pause the game.

Look familiar? It's still fun! KPL is as powerful
and capable as it is easy to use

KPL-cool

Volunteer-contributed MissileCommand.kpl – a great
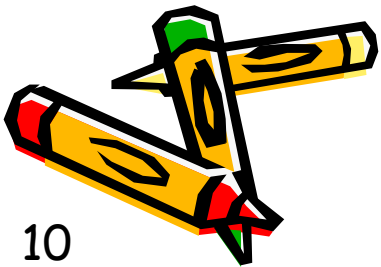game 20 years ago, and a great KPL example today!
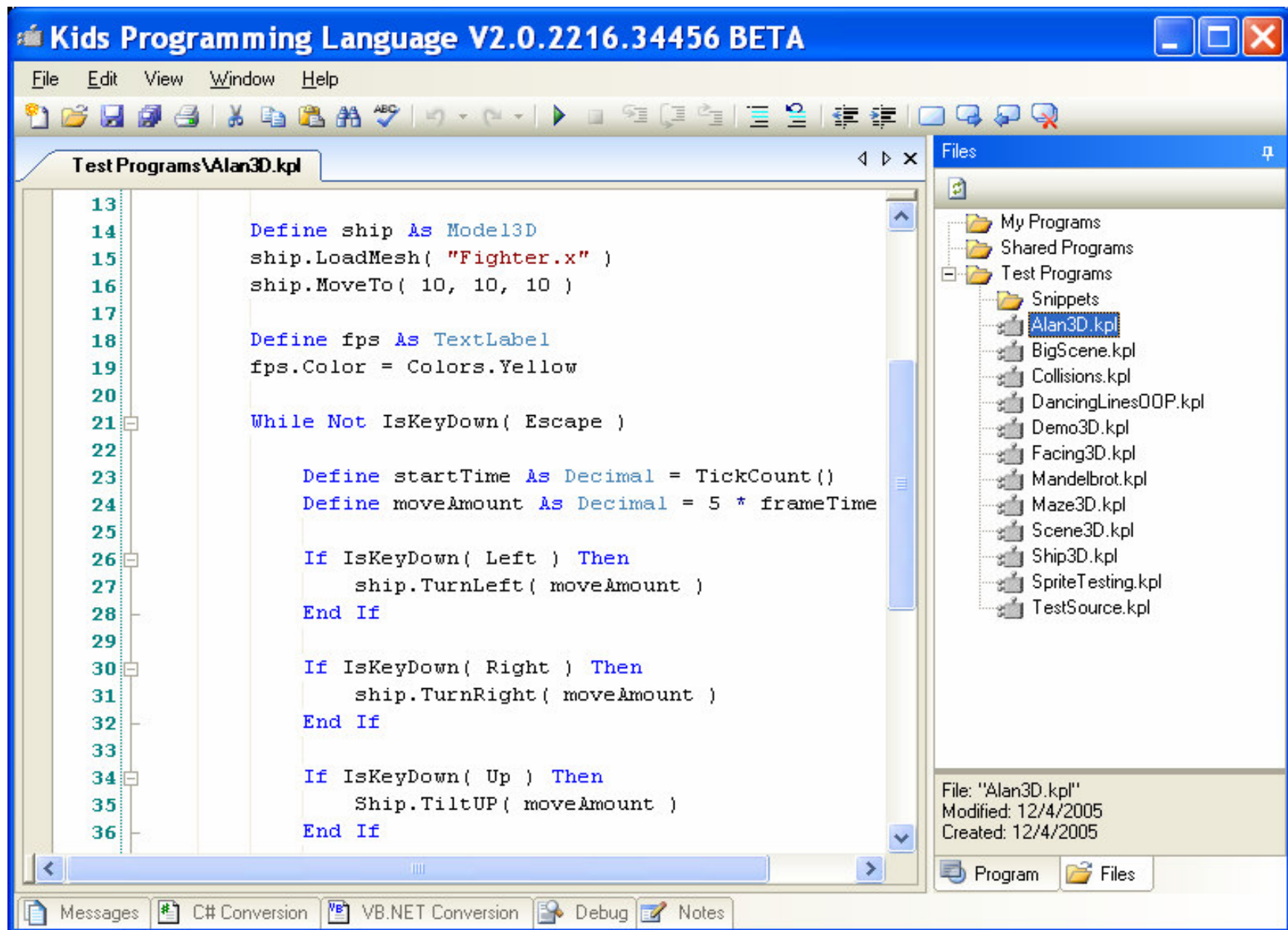
Pedagogical Goals

- **Fun:** learning is best when learning is fun
- **Accessible:** easy to get started
- **Engaging:** games, graphics, sounds
- **Simple:** resist CS tendency toward increasing complexity
- **Rewarding:** see quick, fun results from one's work
- **Highly leveraged:** maximum function from minimum code
- **Progressive:** lots of concepts to learn, step by step
- **Preparatory:** easy 'graduation' to C#, VB or Java
- **Modern:** consistent with current software design standards
- **Publishable:** in source form now, as executables soon
- **State of the art:** extensible use of current technology
- **International:** 16 IDE language versions already available
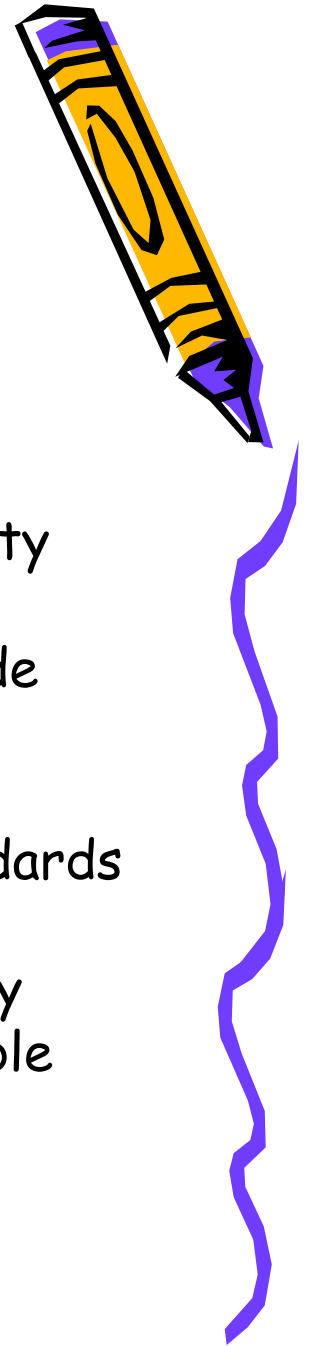
The KPL IDE

- Modern, and specifically designed to "graduate" beginners to VisualStudio.NET or Eclipse
- Powerful code editor with color coding, tooltips, intellisense, autocomplete and code snippets – all to assist learning **and** productivity
- File, Code, Image and Sound Explorers
- Debugging, stepping, and automatic watch window
- C# and VB.NET code conversions currently, with many requests for Java

KPL v 2 IDE Screenshot

11

Standard but simple debugging support in KPL v 2. The Debug pane automatically shows type and value of **all** in-scope variables.

KPL's Program Explorer provides a hierarchical display of and navigation based on all elements of the KPL program – a very handy as well as pedagogical feature

13
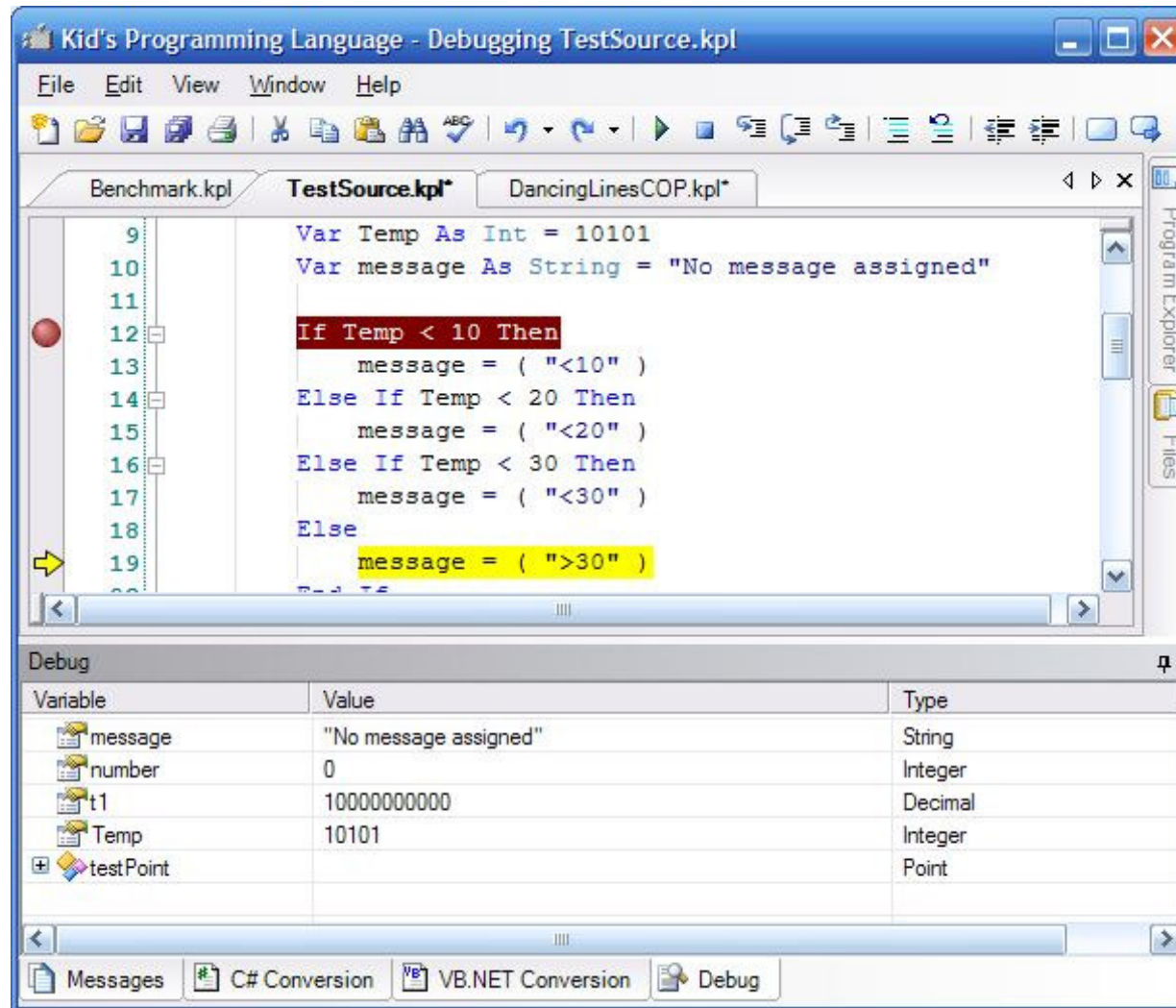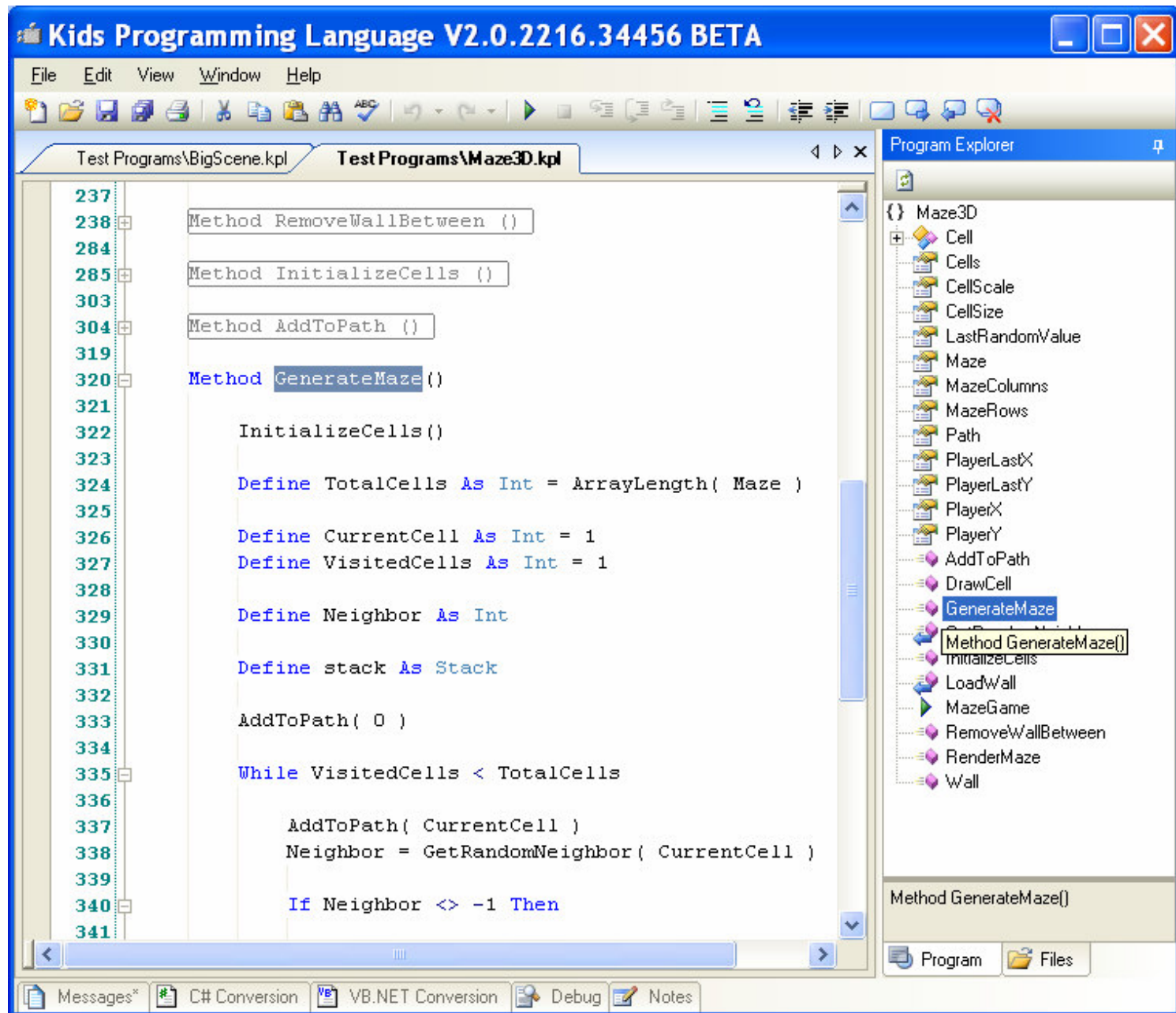
KPL Community: **Global!**

- IDE in **16** languages
- Web site in 3 languages
- Tutorial in 3 languages
- **Dozens** of KPL games and examples
- Books and curriculums in progress
- All of that in the **first 6 months**
- All of that **volunteer** contributions!
- This response inspires our own efforts building KPL, **and** shows its global potential for CS

KPL v 1 - in Brazilian Portuguese!

Kid's Programming Language

File   Edit   View   Window   Help

DrawTree.kpl

```
 7
 8   Method drawTree(maxDepth As Int, branchLength As Decimal,
 9
10       Define deltaX As Decimal
11       Define deltaY As Decimal
12       Define lastX As Int
13       Define lastY As Int
14
15       Define newWidth As Int
16
17       //make the branch width get s
18       newWidth = 10
19       newWidth = newWidth - (curren
20       newWidth = newWidth + Random
21
22       // the new width cannot be be
23       If(newWidth < 1) Then
24           newWidth = 1
25       End If
26
27       //set the new width
28       PenWidth(newWidth)
29
30       //use different colors the de
31       If(currentDepth = 0) Then
32           Color(12) // brown
```
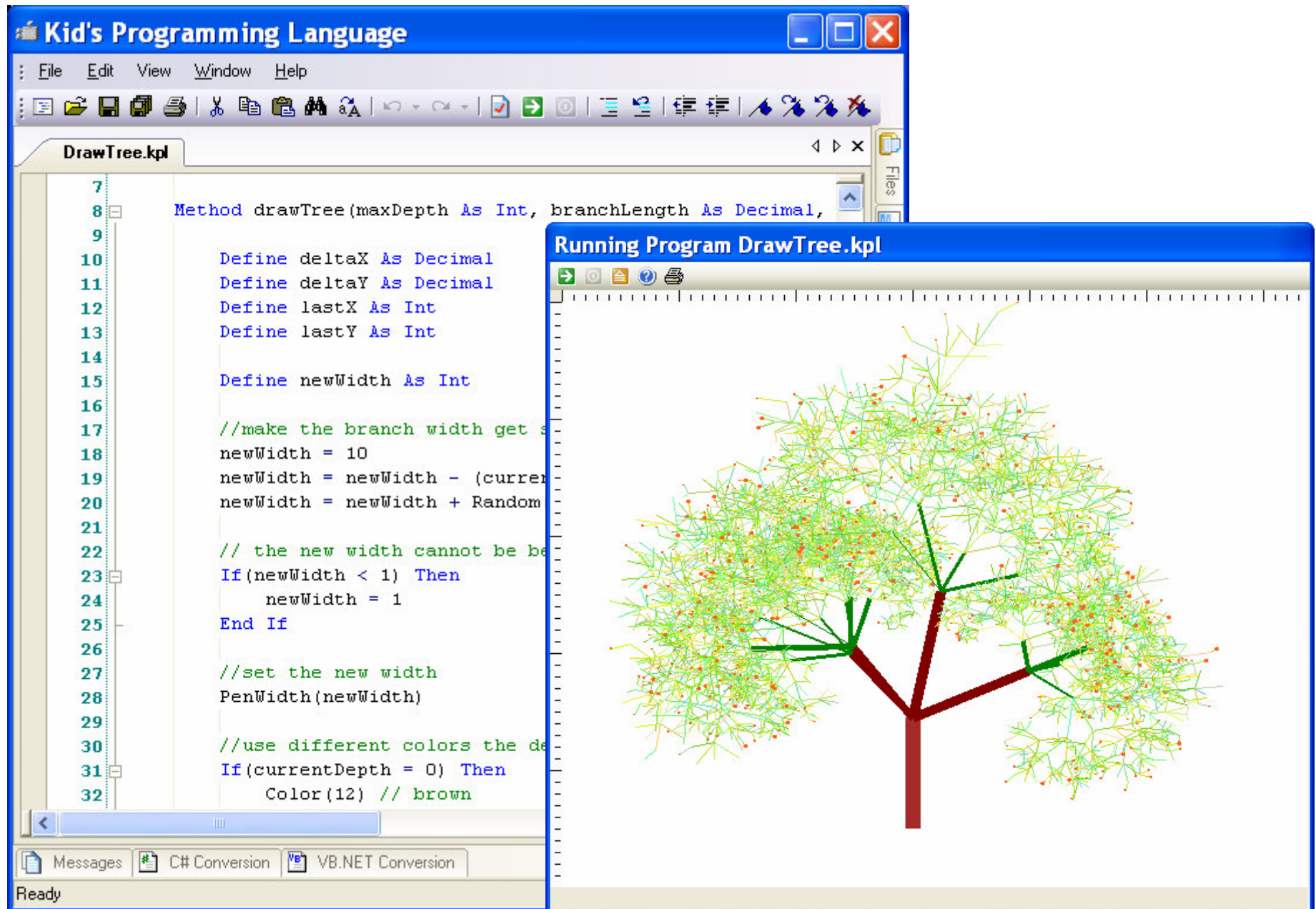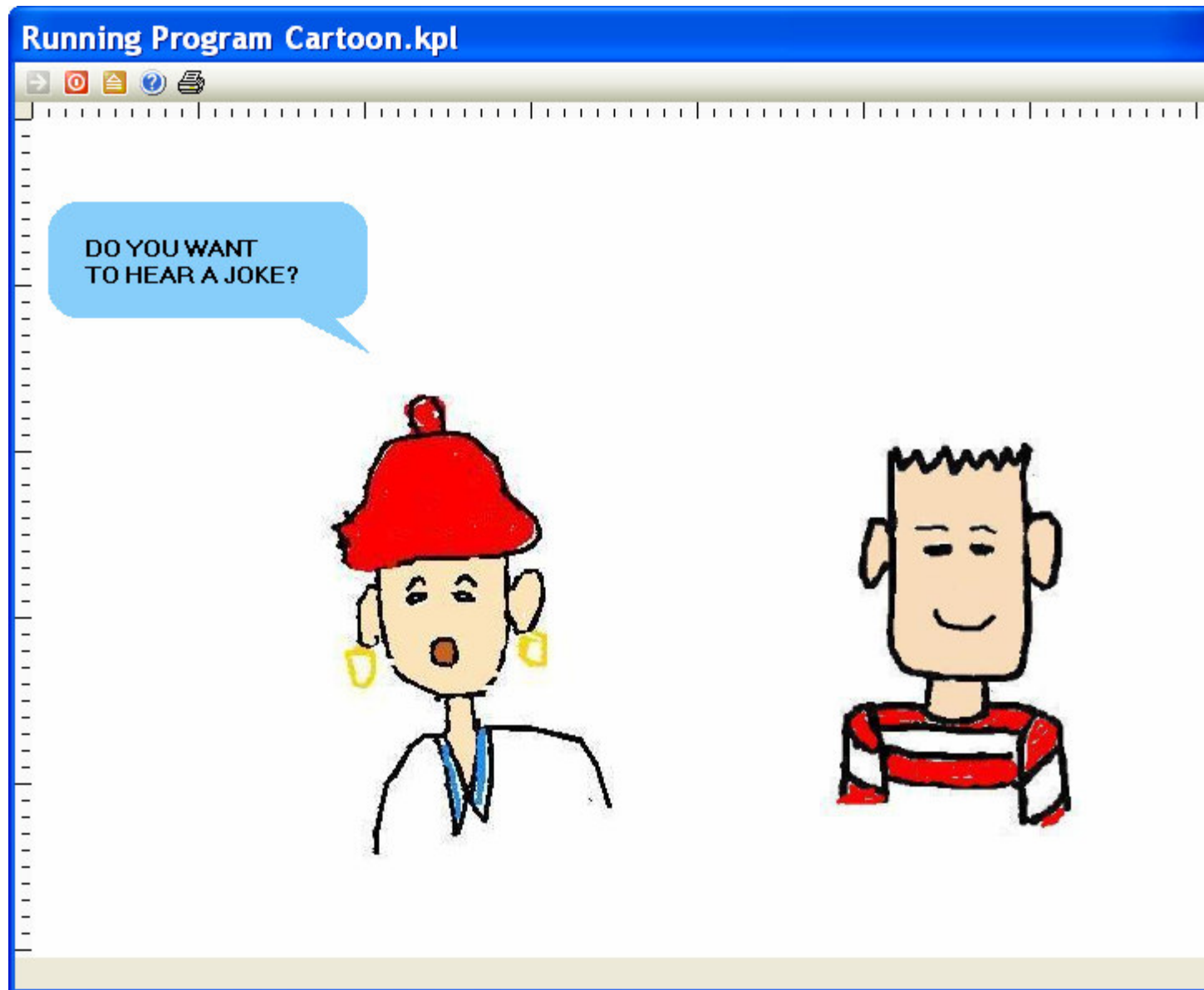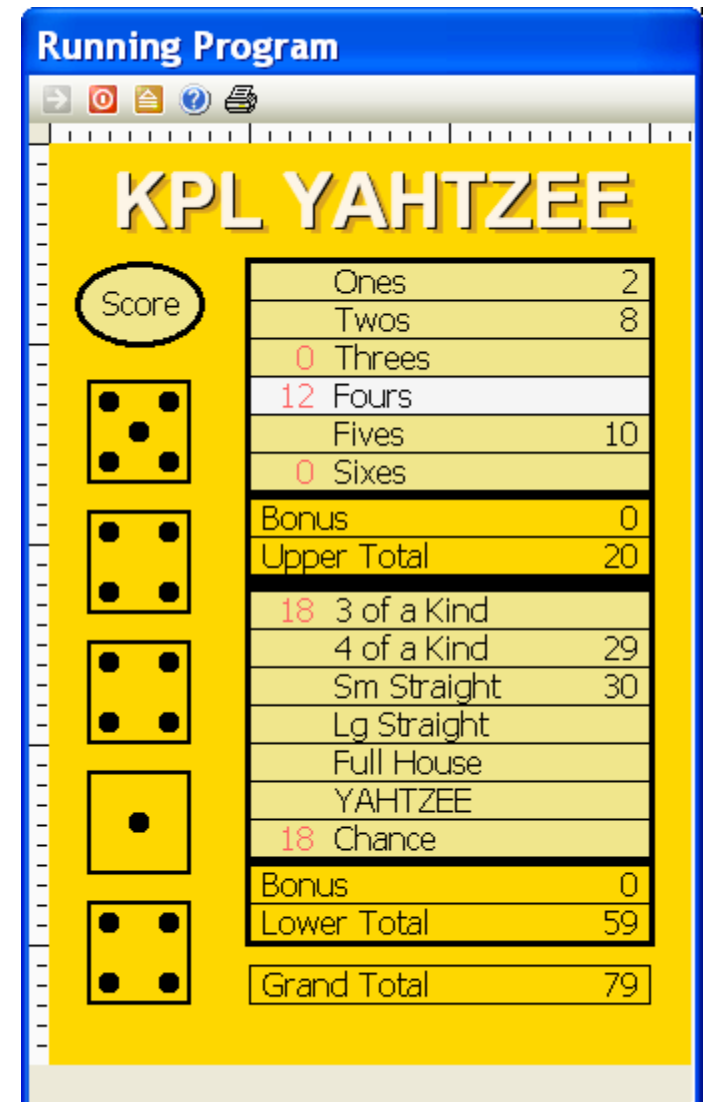
Messages   C# Conversion   VB.NET Conversion

Ready

Running Program DrawTree.kpl

Recursive, random cherry tree generator in KPL: a high school
class project from a computer programming class in Guam

16

Volunteer-contributed cartoon program. KPL's support for graphics, animation and sound offer **lots** of potential for **creativity**, not just coding.

Running Program TicTacToe.kpl

X X
X O
O

0 — Jon
1 — Andrea

Andrea, click on the board to place your 0

Running Program

SUPER SOCCER

Running Program

KPL YAHTZEE

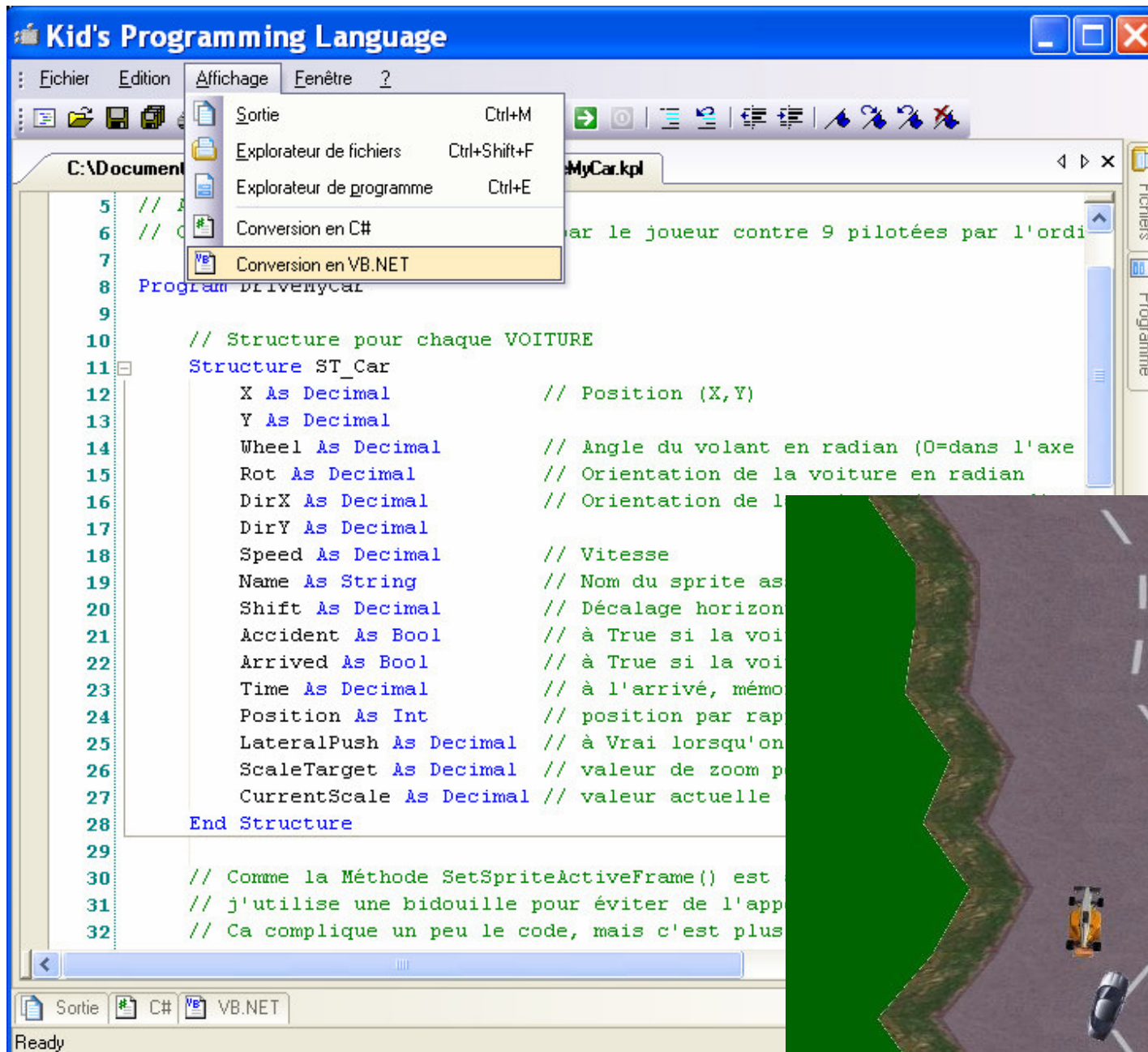| Score		
	Ones	2
	Twos	8
0	Threes	
12	Fours	
	Fives	10
0	Sixes	
	Bonus	0
	Upper Total	20
18	3 of a Kind	
	4 of a Kind	29
	Sm Straight	30
	Lg Straight	
	Full House	
	YAHTZEE	
18	Chance	
	Bonus	0
	Lower Total	59
	Grand Total	79

18

Just a few of the volunteer-contributed open source KPL games

19   KPL's IDE in French, displaying and playing a game written and commented in French.

KPL v 2: March 2006

- Simple experience preserved, great power added
- 1200% performance gain over KPL v 1
- Simple class-based programming
- KPL-simple 3D programming
- Remote control of robots! Use gamepads!
- Open architecture for runtime libraries
- Executables and an SDK will be the first features added after KPL v 2 release

Simple KPL v 2 code for display and control of a 3D spaceship model – with 45 KPL instructions! Note new class-based programming model.
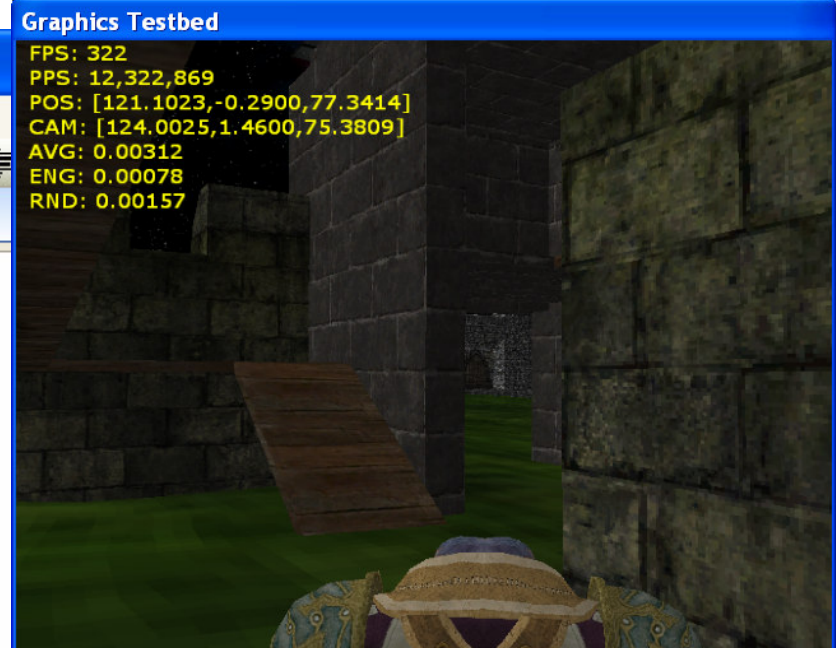
21
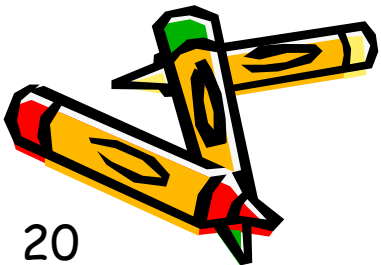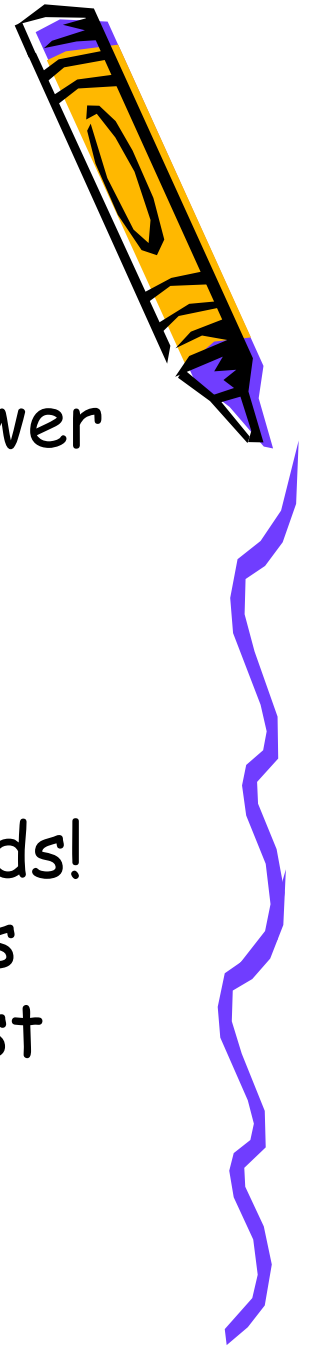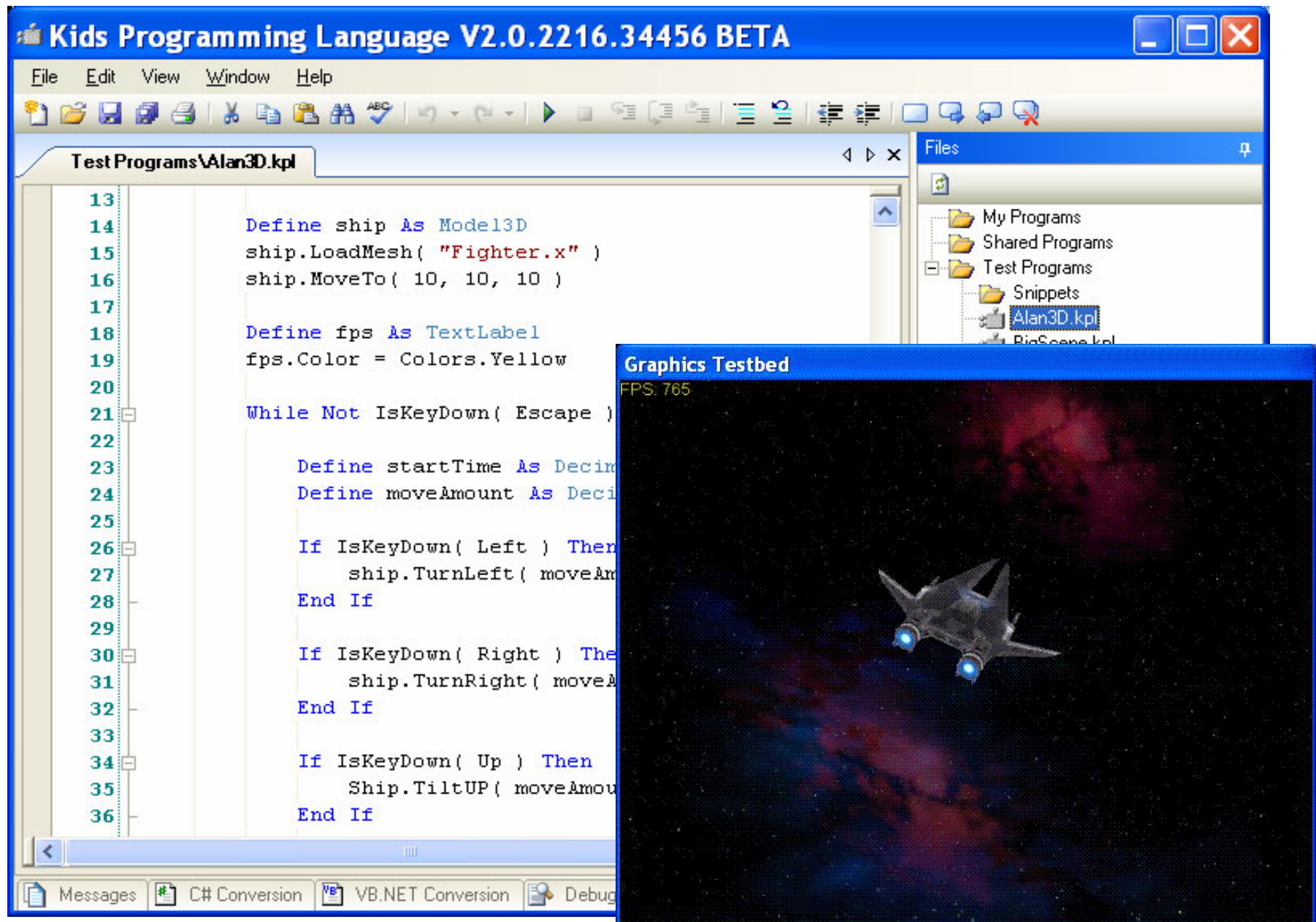
Kid's Programming Language

File   Edit   View   Window   Help

Test Programs\BigScene.kpl

```
105
106    If IsKeyDown( Right ) Then
107        Player.TurnRight( frameTime * 2 )
108    End If
109
110    If IsKeyDown( Up ) Then
111        If IsKeyDown( Shift ) Then
112            player.Forward( moveAmount * 2 )
113        Else
114            player.Forward( moveAmount )
115        End If
116    End If
117
118    If IsKeyDown( Down ) Then
119        player.Back( moveAmount )
120    End If
121
122    If IsKeyDown( Space ) And Not JumpMode The
123        JumpMode = True
124        JumpStart = TickCount()
125    End If
126
127    If IsKeyDown("U") Or JumpMode Then
128        player.Up( moveAmount * 2 )
129        If TickCount() - jumpStart > 60 Then
130            JumpMode = False
131        End If
132    End If
133
```

Messages*   C# Conversion   VB.NET Conversion   Debug   Notes

Graphics Testbed

FPS: 322
PPS: 12,322,869
POS: [121.1023,-0.2900,77.3414]
CAM: [124.0025,1.4600,75.3809]
AVG: 0.00312
ENG: 0.00078
RND: 0.00157

Graphics Testbed

FPS: 534
PPS: 19,162,664
POS: [12.4281,28.3904,160.5782]
CAM: [15.5907,31.0898,159.0788]
AVG: 0.00187
ENG: 0.00066
RND: 0.00171

22

125 KPL instructions enable a large 3D scene with 3 complete castle models and a 3D player avatar who can climb, fly, fall and explore

Not just for Kids!

- Most usage to date ages 10 to 16
- KPL intends to be the best choice for beginning programmers of **any** age
- Current plan is to simply call it **KPL**
- KPL has only been available for 6 months, but things are happening very quickly
- University usage so far is non-US only
- Prominent US CS programs are examining KPL for curriculum use
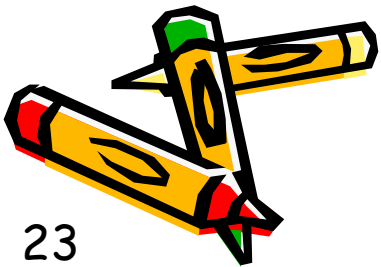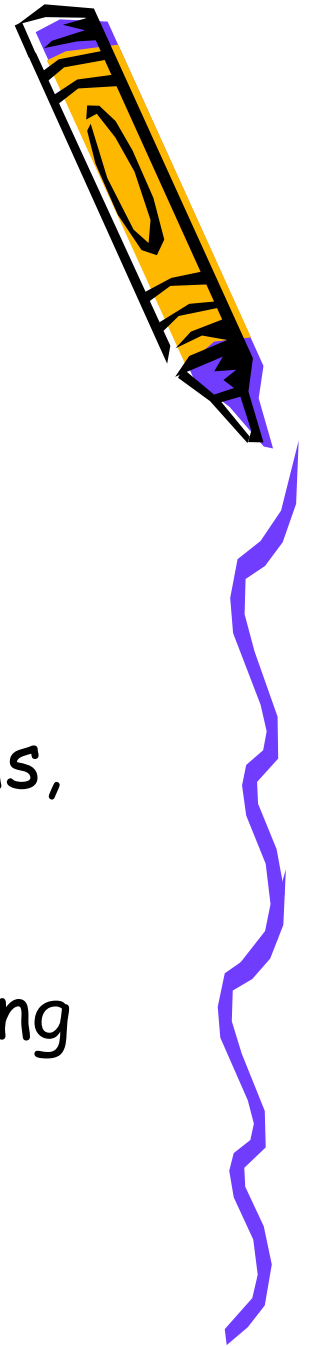
You're Invited!

- Website: www.k-p-l.org

- We welcome personal, academic or research use of KPL – and remember, it's **freeware**

- We welcome volunteer participation in the community

- Can you help spread the word? KPL currently has $0 sponsorship, and no advertising or PR

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