FIREFLY: AN EDUCATIONAL VECTOR GRAPHICS LANGUAGE

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Motivation

- 2D vector graphics
- Coding in FF requires some knowledge of vector algebra
- Teaching aid for vector algebra
- Variant of the LOGO language
Overview of FF

• No explicit type declarations, but strongly-typed
• Operator overloading with Vec2s
  \[ [0.2,0.5] + [0.5, 0.2] = [0.7, 0.7] \]

• Very limited standard library functions: cos(), sin(), sqrt()
Overview of FF

• Starting from the firefly’s position, draw line in a particular **direction**, till a specified **distance**.

• Firefly’s position always known. Specify direction vector, distance to move

• Eg: 0.5 on [1,0]

  Draw line in the [1,0] unit vector direction

  FF is at (0,0) ———— (0.5,0)

  Update FF’s location to (0.5,0)
Overview of FlatC

• High-level FF code to **Low-Level 3-Address Code** (FLATC)
• Translate FF’s if-else, while and functions to gotos and labels in FlatC
• Support Nested if-else, while, etc.
• Function calls implemented using goto *pointers (GCC extension)
Compiler Flow

Scanner → Tokens → Parser → AST → (Compile.ml)

OpenGL + GLUT → GCC Compiler → Executable

Syntactic Stack

Semantic Analyser

Semantic Stack

FlatC → Translator (flatc.ml)
Sample Programs