



COMS W4115 – Programming Languages and Translators
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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 $(0,0)$ $(0.5,0)$

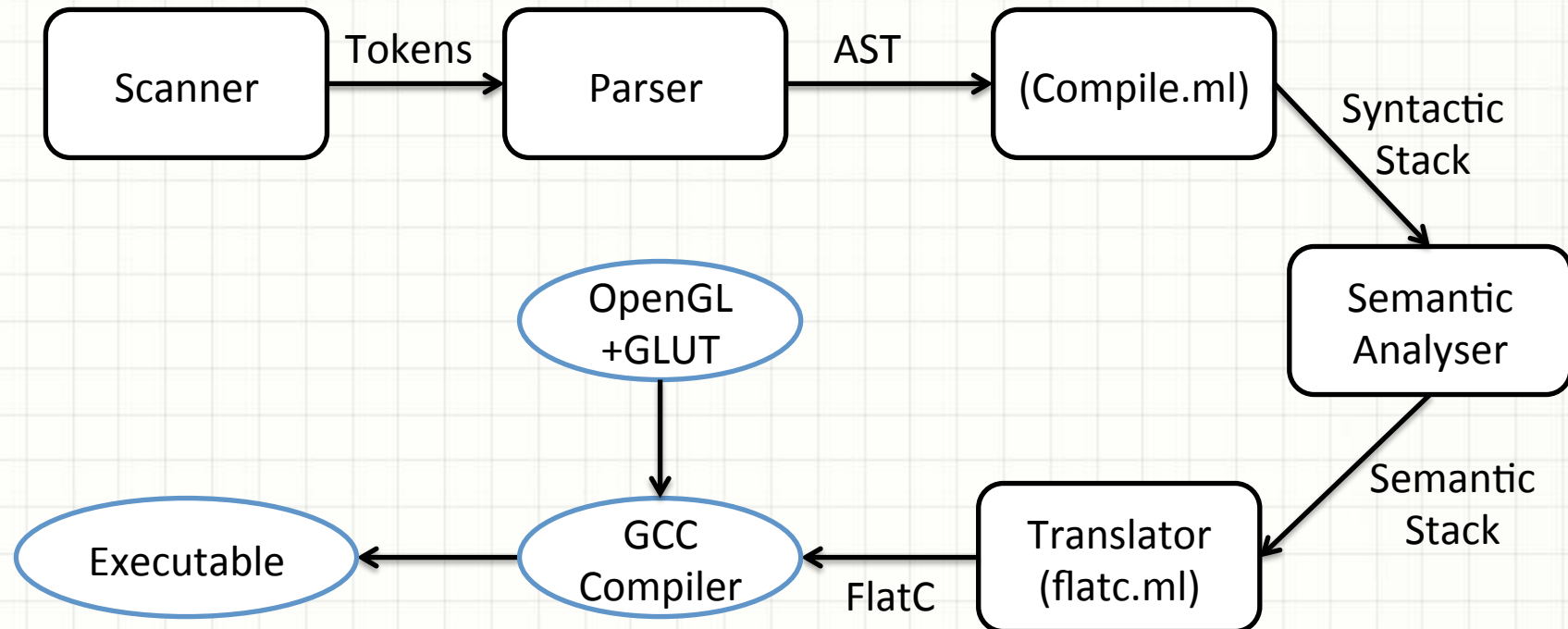


Update FF's location to $(0.5,0)$

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





Sample Programs