

# NaCl vs. Emscripten

Aaron Dodson

Geoffrey Douglas

CS263: Programming Languages

# Review of Emscripten

- Cross-compiler from LLVM bitcode to Javascript
- Includes Javascript implementation of standard library, filesystem, and runtime support

# Review of NaCl

- Run native compiled code on the web
- Portability
- Security
- Modules and Instances
- Communication

# PNGCrush

- Open source command-line .png image optimizer
- Reduces the size of .png images based on multiple compression methods
- 27 source files, 30,000+ lines of code

# Web App Wrapper

- HTML5 Drag and Drop for file upload
- NaCl uses HTML5 filesystem API for file I/O
- Built on Twitter Bootstrap
- Blobs

# Porting PNGCrush with Emscripten

- Source files compiled to LLVM bitcode
- LLVM bitcode compiled to Javascript
- Reading/Writing files
- Cross-compiled code function calling
- Communication



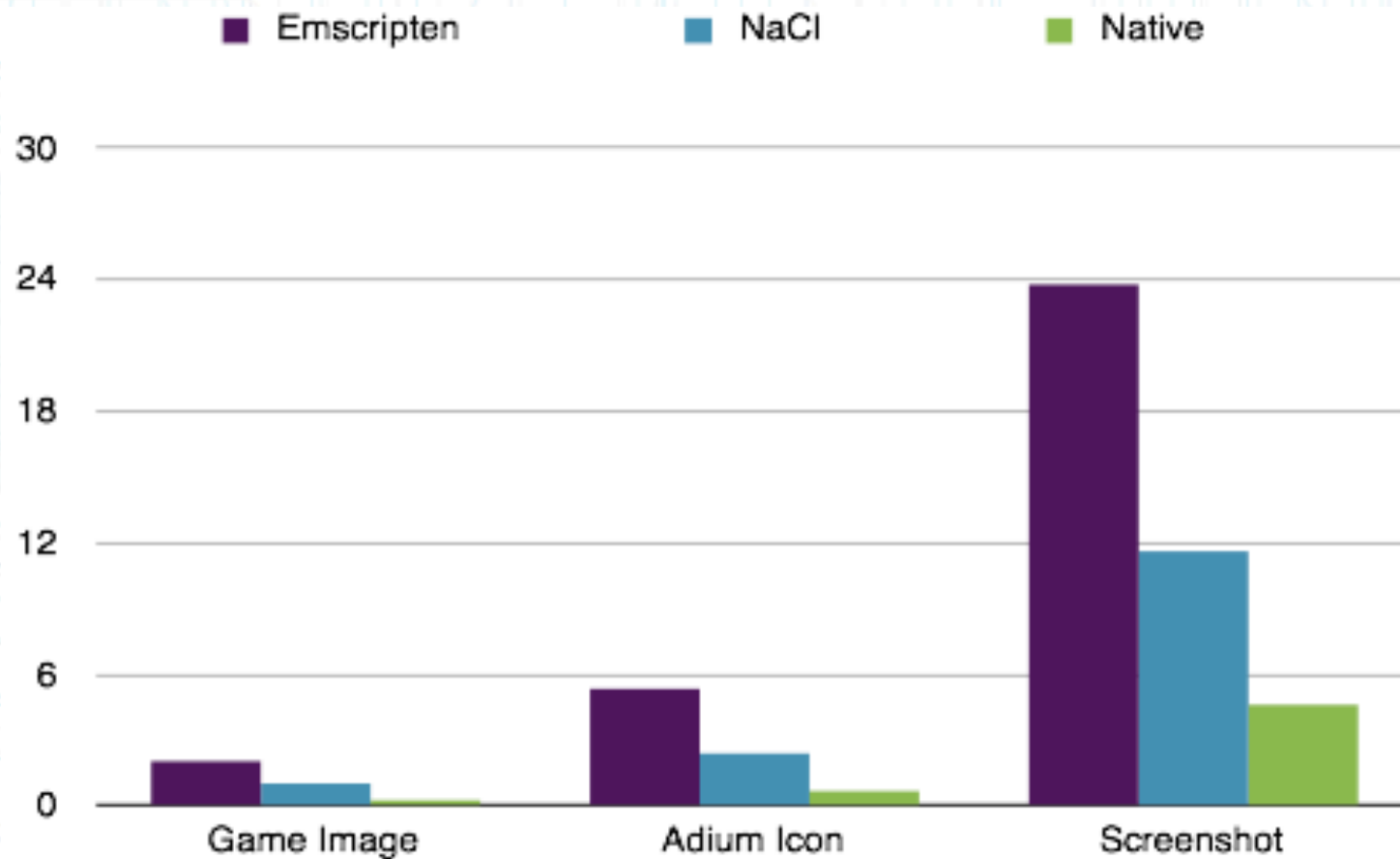
# Porting PNGCrush with NaCl

- `hello_nacl_io`
- Modifying the makefile
- Filesystem API
- Call to PNGCrush main
- Communication
  - Asynchronous

**Demo**



# Comparisons



# Implementation Difficulties

- Poor documentation
- PNGCrush codebase
- Communication in Emscripten port

# Conclusions

- Better performance for NaCl
- Good for porting legacy codebases
- Easy web app creation

# Questions?