C language in our world

15.5. 2017 FI MUNI
Brno
@jurajmichalek
http://georgik.rocks
https://www.ysofters.com
Grab the source code

https://github.com/ysoftdevs/cpp-examples

https://github.com/georgik/LampESP

https://github.com/ysoftiota
Who am I?

Blog: http://georgik.rocks

YSofters Blog: https://www.ysofters.com
C language today
Allegro5
NuGet
SDL2
Gradle
IDEs
IoT
Jenkins, Bamboo, TeamCity
Go language
Once upon a time
there lived a mighty king
His name was C
He ruled nearly everything
telco, med, banks, games
King was getting older and paunchy
World was changing
Changing so fast..
New rivals have arrived
Caravane with nomads from the land of Perl
Lords of snakes
from the land of Python
Jewelers from the land of Ruby
Sharp warriors from the land of .Net

from this... Microsoft .net ...to this! Microsoft .NET
Coffee magnates from the island of Java
Cocoa drinkers from the land of Apple trees
Old kingdom of C fell into oblivion
People were scared to enter the realm of old C
Beware SIGSEGV dragons!
Memory leak swamps!
Zombies of legacy code!
Evil MACROmancers

#define true false
Insidious multi-threaded bugs.
Scary place for life
The era of Cloud has emerged
Technologies influencing each other
Programming languages we know strongly influence the way we think about programming.

- JS Conf 2014 - Jenna Zeigen
Breeze of fresh ideas starts blowing from other technologies...
Bridge between technology

C - C#
C - Java
C - Python
C - Android, iOS, UWP
Allegro
<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG_COMPILER</td>
<td>CG_COMPILER-NOTFOUND</td>
</tr>
<tr>
<td>CG_D3D9_LIBRARY</td>
<td>CG_D3D9_LIBRARY-NOTFOUND</td>
</tr>
<tr>
<td>CG_GL_LIBRARY</td>
<td>CG_GL_LIBRARY-NOTFOUND</td>
</tr>
<tr>
<td>CG_INCLUDE_PATH</td>
<td>CG_INCLUDE_PATH-NOTFOUND</td>
</tr>
<tr>
<td>CG_LIBRARY</td>
<td>CG_LIBRARY-NOTFOUND</td>
</tr>
<tr>
<td>CMAKE_BUILD_TYPE</td>
<td>RelWithDebInfo</td>
</tr>
<tr>
<td>CMAKE_INSTALL_PREFIX</td>
<td>C:/Program Files (x86)/Microsoft Visual Studio 12.0/VC</td>
</tr>
<tr>
<td>FRAMEWORK_INSTALL_PREFIX</td>
<td>/Library/Frameworks</td>
</tr>
<tr>
<td>LIB_SUFFIX</td>
<td></td>
</tr>
<tr>
<td>NO_FPU</td>
<td></td>
</tr>
<tr>
<td>SHARED</td>
<td>v</td>
</tr>
<tr>
<td>STRICT_WARN</td>
<td></td>
</tr>
<tr>
<td>WANT_ACODEC_DYNAMIC_LOAD</td>
<td>v</td>
</tr>
<tr>
<td>WANT_ALLOW_SSE</td>
<td>v</td>
</tr>
<tr>
<td>WANT_ALSA</td>
<td>v</td>
</tr>
<tr>
<td>WANT_ANDROID</td>
<td></td>
</tr>
<tr>
<td>WANT_ANDROID_LEGACY</td>
<td></td>
</tr>
<tr>
<td>WANT_AQUEUE</td>
<td></td>
</tr>
<tr>
<td>WANT_AUDIO</td>
<td></td>
</tr>
<tr>
<td>WANT_CG_SHADERS</td>
<td></td>
</tr>
</tbody>
</table>

Press Configure to update and display new values in red, then press Generate to generate selected build files.

Not building es_audio_chain
Not building esynth
Not building tests due to missing library. Have: allegro allegro_main allegro_image allegro_col
Configuring done
Generating done
Allegro 5.1

Win, Lin, Mac

iOS, Android

http://alleg.sourceforge.net/a5docs/refman/
Initialization

al_init();
Graphic environment

al_create_display(int w, int h)
Conemu Maximus 5

Powerful terminal for Windows use with PowerShell, Python, Ruby…

https://code.google.com/p/conemu-maximus5/
CMake 3.0.2
By: scaftw

CMake is a family of tools designed to build, test and package software. CMake is used to control the software compilation process using simple platform and compiler independent configuration files. CMake generates native makefiles and workspaces that can be used in the compiler environment of your choice.

3,884 downloads | Tags make build test package

C:\> choco install cmake

Yum/Apt-like installation of Win packages
https://chocolatey.org
Made with SDL
Made with SDL
NuGet - http://www.nuget.org
Simple DirectMedia Layer (SDL)
SimpleDirectMedia Layer is a cross-platform multimedia library designed to provide low level access to audio, keyboard, mouse, and display.

Simple DirectMedia Layer Redist
Redistributable components for package 'sdl2'

SDL_image
SDL_image loads images as SDL surfaces.

DD4T Support for DVM4T
A DD4T based implementation of the DVM4T framework. Includes a number of basic Attributes for common field types.

DVM4T Framework
Domain View Models For Tridion - a .NET framework for creating strongly typed domain view models based on content.

DD4T Providers for Tridion 2011 sp1
Providers for SDL Tridion 2011 SP1

Created by: Sam Lantinga, SDL contributors
Id: SDL
Version: 1.2.15.15
Last Published: 5.7.2013
Downloads: 1398
License
- LGPL-2.1
- Project Information
- Report Abuse

Description:
Simple DirectMedia Layer is a cross-platform multimedia library designed to provide low level access to audio, keyboard, mouse, joystick, 3D hardware via OpenGL and 2D video framebuffer.

Homepage: http://www.libsdl.org/

Tags: sdl native CoApp native package

Dependencies:
- SDL.redist (≥ 1.2.15.15)

Each item above may have sub-dependencies subject to additional license agreements.
Multiplatform

SDL officially supports Windows, Mac OS X, Linux, iOS, and Android.

Support for other platforms may be found in the source code.
SDL versions

1.2 stable - rock solid

2.x development - new features
SDL_init(flags)

SDL_INIT_TIMER - The timer subsystem
SDL_INIT_AUDIO - The audio subsystem
SDL_INIT_VIDEO - The video subsystem
SDL_INIT_CDROM - The cdrom subsystem
SDL_INIT_JOYSTICK - The joystick subsystem
SDL_INIT_EVERYTHING - All of the above
SDL_INIT_NOPARACHUTE - Prevents SDL from catching fatal signals
SDL_INIT_EVENTTHREAD - Runs the event manager in a separate thread
Quit application

SDL_quit()
Window

SDL_CreateWindow("Hello World!", 100, 100, 640, 480, SDL_WINDOW_SHOWN);
Load bitmap

SDL_Surface *bmp = nullptr;
bmp = SDL_LoadBMP("smajlik.bmp");
Visual data

SDL_Renderer
SDL_Texture
Keyboard

SDL_PollEvent(SDL_Event *event)

event.key.keysym.sym
Timer

SDL_TimerID SDL_AddTimer(
    Uint32       interval,
    SDL_TimerCallback callback,
    void*        param)
Mouse

SDL_GetMouseState(*x, *y);
Text

Not implemented
Extensions

extension for many languages:

C++, Java, PHP, Python, Ruby
PyGame

Power of C and Power of Python

http://www.pygame.org
Cross-platform development of smartphone application with the Kivy framework
Gradle Native Builds
C/C++, Objective-C

http://gradle.org/getting-started-native/
Build tool

Exensible by plugins

Power of Domain Specific Language
http://plugins.gradle.org
Project structure

Convention over configuration

Decrease number of decisions that developers need to make

http://en.wikipedia.org/wiki/Convention_over_configuration
C plugin

```gradle
apply plugin: 'c'

model {
    components {
        main(NativeExecutableSpec) {
            
        }
    }
}
```
Gradle command line & GUI
gradle components
Gradle build Linux package

Netflix Nebula OS Package plugin:

http://plugins.gradle.org/plugin/nebula.os-package
plugins {
    id "nebula.os-package" version "2.0.3"
}

apply plugin: 'c'

model {
    components {
        hello(NativeExecutableSpec) {
        }
    }
}

ospackage {
    packageName = "hello"
    version = "1.0"
    release = 1
    os = LINUX
    packageDescription = "Linux Gradle hello package"
    summary = "contains binary with hello world example"
    from("build/binaries/helloExecutable") {
        into "/usr/bin/"
    }
}

buildDeb {
    requires("libc6")
}

buildRpm {
    requires("libc6")
}
Build package

Note: Gradle supports abbreviation. You can write hE instead of helloExecutable
SDL2 and Android

Android Studio + NDK + Gradle
IDE & Text editors
```c
#include <stdio.h>

int main() {
    printf("Greetings from cloud!\n");
    return 0;
}
```
A hackable text editor for the 21st Century

https://atom.io/
void base64_encode(const uint8_t *data, size_t len, char *dst)
{
    size_t src_idx = 0;
    size_t dst_idx = 0;
    for (; (src_idx + 2) < len; src_idx += 3, dst_idx += 4)
    {
        uint8_t s0 = data[src_idx];
        uint8_t s1 = data[src_idx + 1];
        uint8_t s2 = data[src_idx + 2];

        dst[dst_idx + 0] = charset[(s0 & 0xfc) >> 2];
        dst[dst_idx + 1] = charset[(s0 & 0x03) << 4] | ((s1 & 0xf0) >> 4));
        dst[dst_idx + 2] = charset[(s1 & 0x0f) << 2] | (s2 & 0xc0) >> 6);
        dst[dst_idx + 3] = charset[(s2 & 0x3f)];
    }
    if (src_idx < len)
    {
        uint8_t s0 = data[src_idx];
        uint8_t s1 = (src_idx + 1 < len) ? data[src_idx + 1] : 0;

        dst[dst_idx++] = charset[(s0 & 0xfc) >> 2];
        dst[dst_idx++] = charset[(s0 & 0x03) << 4] | ((s1 & 0xf0) >> 4));
        if (src_idx + 1 < len)
            dst[dst_idx++] = charset[(s1 & 0x0f) << 2];
    }
Visual Studio Code

Code editing. Redefined.
- https://code.visualstudio.com/
Toolchain detection
Edit project

```c
#include <stdio.h>

int main() {
    printf("Hello Brno!\n");
    return 0;
}
```

Build finished in 2s 145ms (4 minutes ago)
Leverage Refactor
Use Debugger
Disabled by default for all JetBrains tools :-(

Fine tune
C in embedded and IoT world

https://github.com/ysoftiota
Arduino + Platform IO

http://platformio.org/
LampESP example

https://github.com/georgik/LampESP

- OTA
- WifiManager
- Web Server
- MQTT Client (works also with Bluemix)
- TaskScheduler (async style)

More info: http://georgik.rocks/category/iot/
Node-RED

https://nodered.org/
YSoft Iota Play

https://github.com/ysoftiota/yi-play

Když firmy pořizují vývojářům elektroniku „na hraní“:
Monkey C

Garmin Connect IQ

Iot-inc - podcast

http://www.iot-inc.com/category/mediatype/podcasts/
Bastlíři SH

http://macgyver.sh.cvut.cz/

OpenAlt 2016 - video
https://openalt.cz/2016/program_detail.php#event_3135
Continuous integration
Hit for Windows users: Do not install Jenkins into path with special characters and blank space. E.g: Wrong: C:\Program Files (x86)\Jenkins. Correct: Use C:\projects\jenkins
From desktop to cloud

Software is slow
Software is hard to write
Software is hard to scale
Go

http://golang.org

Authors:

● Ken Thompson - known for Unix
● Rob Pike - known for UTF-8
● Robert Griesemer
Main features of language

- Syntax patterns from dynamic languages
- Performance of C
- Blazing fast compilation
- Output one binary
- Concurrency
- Libraries from Internet (e.g., Github)
- Works on: Mac, Linux, Windows and more...
Materials

Andreas Krennmaier
http://synflood.at/tmp/golang-slides/mrmcd2012.html#1

Steve Francia
Thanks to artists

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http://www.flickr.com/photos/fatboyke/3405148748/
http://www.flickr.com/photos/teveve/6301993588/
http://www.flickr.com/photos/stevewilhelm/6242822362/
http://en.wikipedia.org/wiki/Chess
http://www.flickr.com/photos/akosma/9486807123/
http://www.flickr.com/photos/charlestilford/6362884553/
http://www.flickr.com/photos/anieto2k/4455227465/
http://www.geograph.ie/photo/1113036
http://pako0007.deviantart.com/art/Zombie-Imp-2-267822507
http://www.flickr.com/photos/bogenfreund/367091428/
http://www.flickr.com/photos/infinite-magic/4016608841/
http://www.flickr.com/photos/lennysan/4403695597/
http://www.flickr.com/photos/avaverino/4870587458/
L10N - verify your translations

http://www.microsoft.com/Language
Swiss knife tool for web [https://curl.haxx.se/](https://curl.haxx.se/)

Generate source code:
curl http://www.ysoft.com -o index.html --libcurl download.c
What’s next?

GOTO 2016

The Future of Software Engineering
- Mary Poppendieck

https://youtu.be/6K4ljFZWgW8
The future is already here — it's just not very evenly distributed.
YSofters

Twitter: @ysoftdevs
GitHub: github.com/ysoftdevs
Blog: www.ysofters.com
Technology Hour: www.meetup.com/ysoft-th
Thesis: Andryi.Stetsko@ysoft.com