Developer Guide

version **0.7**

Repo: https://github.com/pointonsoftware/pscore

CORE Business Software Engine

Jira: https://pointon.atlassian.net/browse/PCOR

Revision History

Date	Description	Author	Version
03/15/2020	First created	benziv	v0.1
06/28/2020	Added coding guide	benziv	v0.2
08/15/2020	Updated coding guide	benziv	v0.3
09/17/2020	Added development setup and tips n tricks	benziv	v0.4
10/05/2020	Added How to add a new screen section	benziv	v0.5
10/10/2020	Added How to add a new Core module	benziv	v0.6
10/14/2020	Added How to create a release	benziv	v0.7

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Development setup

Accounts

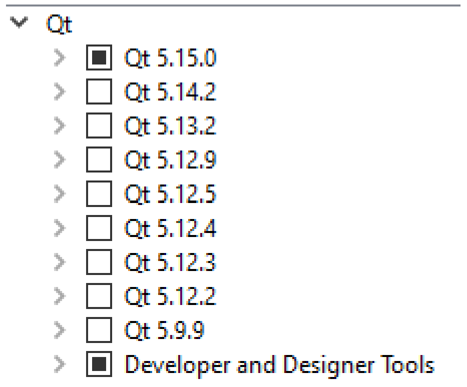
1) Create an account in https://www.github.com/join
2) Create an account in https://www.atlassian.com/
   a. Look for the login button.
   b. You can use social media accounts as your login info.
3) Create an account in https://login.qt.io/register

Downloads

1) Download Qt from https://www.qt.io/download-open-source
2) Download GitHub desktop from https://desktop.github.com

Installation

- **Qt** - Note: QT installation may take ~5.70GB of space and needs internet connection.
  1) Install Qt and login when needed.
     a. Default installation is in C:/ directory.
  2) Make sure to check the following Qt setup:



Qt
- ■ Qt 5.15.0
- ☐ Qt 5.14.2
- ☐ Qt 5.13.2
- ☐ Qt 5.12.9
- ☐ Qt 5.12.5
- ☐ Qt 5.12.4
- ☐ Qt 5.12.3
- ☐ Qt 5.12.2
- ☐ Qt 5.9.9
- ■ Developer and Designer Tools

     a. **Expand Qt 5.15.0** and select the following:
        - MinGW 8.1.0 32-bit
        - MinGW 8.1.0 64-bit
        - Sources
        - Qt Charts
        - Qt Data Visualization
     b. **Expand Developer and Designer Tools** and select the following:

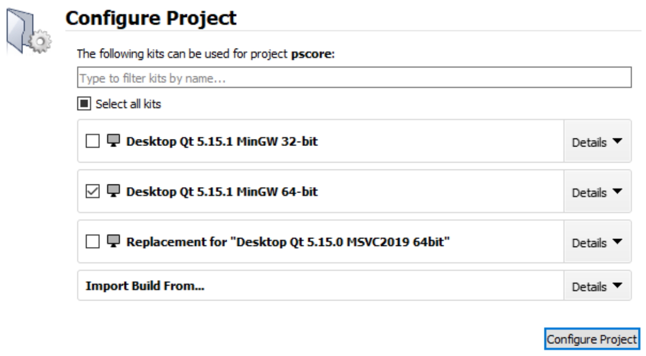
- Qt Creator 4.13.0 CDB Debugger Support
- Debugging Tools for Windows
- MinGW 8.1.0 32-bit
- MinGW 8.1.0 64-bit
- CMake 3.17.1 64-bit
- Ninja 1.10.0

Cloning the repository

- **GitHub Desktop -** Note: Setup will need internet connection)
  1) Execute the downloaded installer
  2) Click on **Sign in to Github.com**
     a. Sign in with your GitHub credentials
- *Before proceeding, make sure you have been added to the GitHub project (contact BenZiv).*
  3) In the **Let's get started** page, select **pointonsoftware/pscore**.
  4) Click on **Clone pointonsoftware/pscore**.
  5) Set the local path to any directory that you want. Hit **Clone.**

Importing project to Qt

1) Run **Qt Creator**.
2) Select File-> Open File or Project
3) Go to the pscore root folder and select **CMakeLists.txt**
4) In Configure Project, select **Desktop MinGW 64-bit** (or depends on your system)



Configure Project

The following kits can be used for project **pscore**:

Type to filter kits by name...

[■] Select all kits

[ ] Desktop Qt 5.15.1 MinGW 32-bit — Details

[✓] Desktop Qt 5.15.1 MinGW 64-bit — Details

[ ] Replacement for "Desktop Qt 5.15.0 MSVC2019 64bit" — Details

Import Build From... — Details

5) Right click on the core project and select **Run CMake**

Coding Guide

Namespace:

Give a namespace to all the code in your module. For example, for a module MyModule.dll, you may give its code the namespace MyModule.

Functions:

- Functions should assure callers that even if an exception is thrown, program invariants remain intact (i.e., no data structures are corrupted) and no resources are leaked. Functions should also assure callers that if an exception arises, the state of the program remains as it was prior to the call.
- Use meaningful and related function names.
- If a function is very small and time-critical, declare it inline
- Keep functions short and simple.
    - Should perform a single operation.
    - This way it simpler to understand, test and reuse.

Example

Consider:

```
void read_and_print()    // bad
{
   int x;
   cin >> x;
   // check for errors
   cout << x << "\n";
}
```

This is a monolith that is tied to a specific input and will never find another (different) use.

Instead, break functions up into suitable logical parts and parameterize:

```
int read(istream& is)    // better
{
   int x;
   is >> x;
   // check for errors
   return x;
}

void print(ostream& os, int x)
{
   os << x << "\n";
}
```

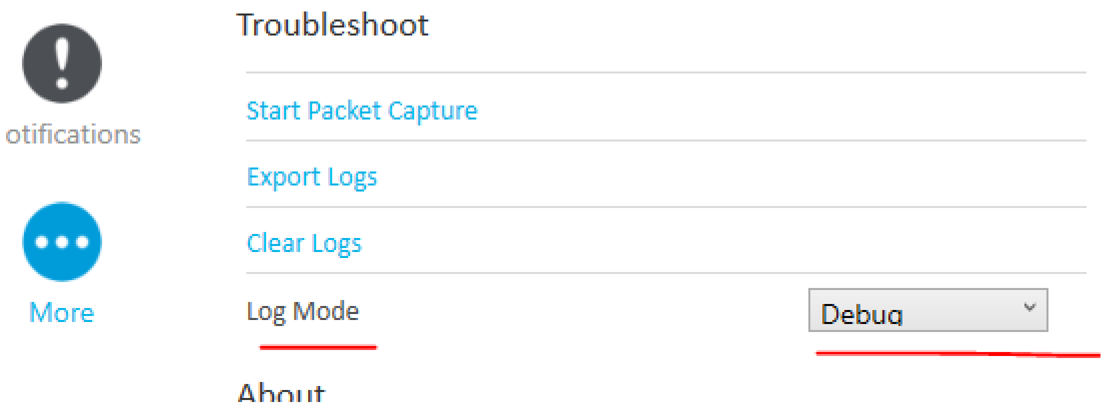
These can now be combined where needed:

```
void read_and_print()
{
   auto x = read(cin);
   print(cout, x);
}
```

- For general use, take T* or T& arguments rather than smart pointers
    - If you won't assign the pointer argument to any member (i.e. it will only be used by the function), avoid using smart pointer.

Logging:

- Write time log for all database request operations.
    - From start of the function call to return of data.
- The logger can be switched to different logger types (file, console, socket).
- LOG macros usage
    - LOG_DEBUG – for verbose logging
    - LOG_INFO – use for any useful information that is helpful in knowing what the user was trying to do.
    - LOG_WARN – use for any conditions where we expect to fail but is handled by the system
    - LOG_ERROR – use in conditions that are critical and should not fail. Otherwise
- Provide an option in the application for the log mode:
    - Debug, Warn, Info, Error



Log Mode: Debug

Pointers:

- Use -Werror=return-local-addr compiler flag to detect dangling pointers.

```
main.cpp:7:7: error: address of local variable 'object' returned [-Werror=return-local-addr]
  int object = 10;
```

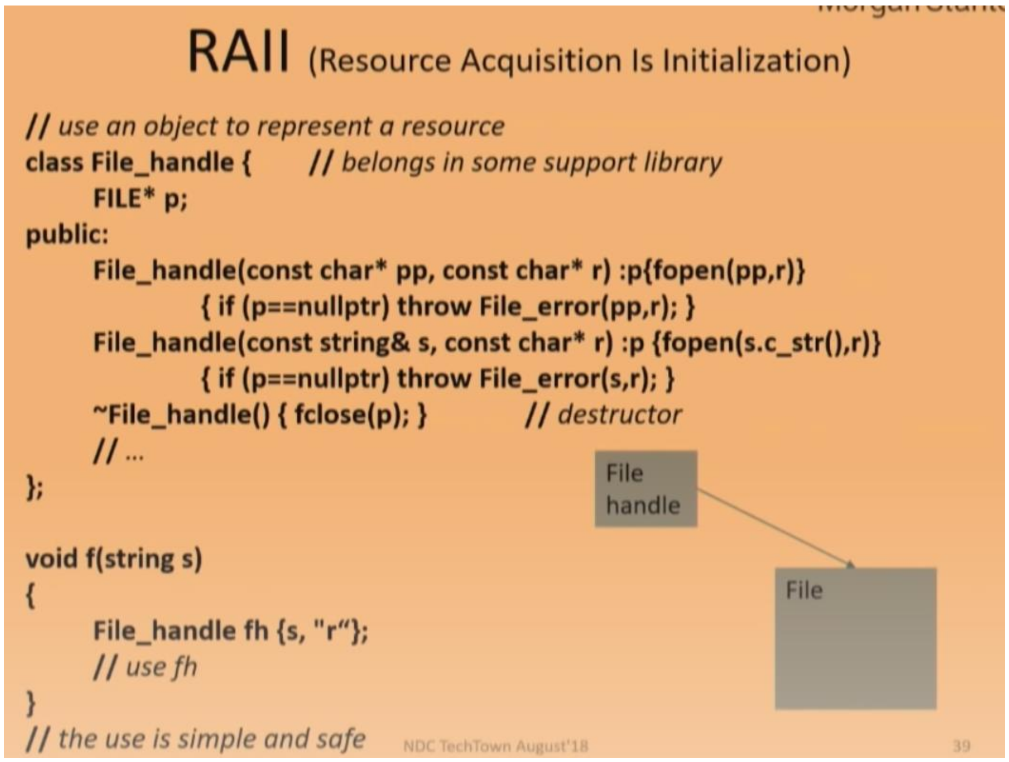
Const-ness:

- int * mutable_pointer_to_mutable_int;
- int const * mutable_pointer_to_constant_int;
- int *const constant_pointer_to_mutable_int;
- int const *const constant_pointer_to_constant_int;

Design Patterns: https://www.youtube.com/watch?v=j9arNRRoPe8

- Adapter pattern to extend std::string to accept const char* null and have to_lower function.
- Builder pattern for the JSON string builder
- Builder Facet for the Items (ItemBuilder, ItemPriceBuilder, ItemSupplierBuilder).
- Builder Facet for the Person (PersonBuilder, CustomerBuilder, UserBuilder, EmployeeBuilder <- for non-system user);

File Handler:



RAII (Resource Acquisition Is Initialization)

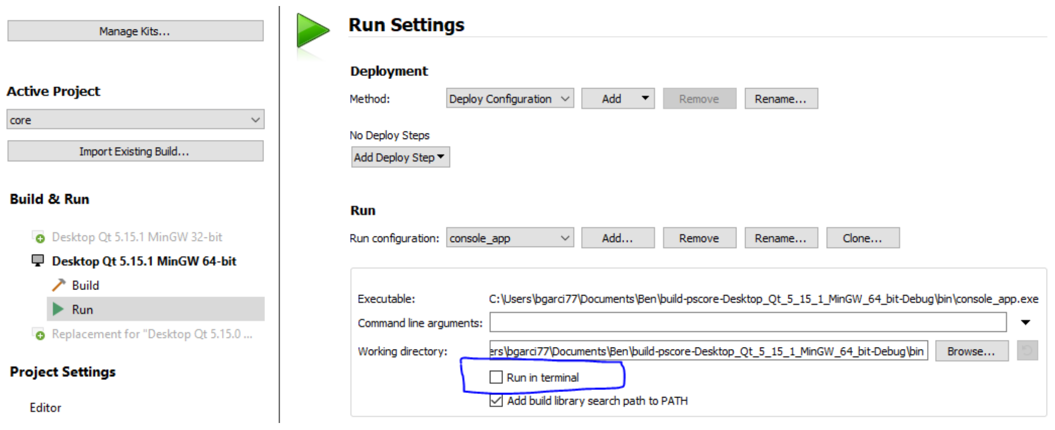
```
// use an object to represent a resource
class File_handle {        // belongs in some support library
        FILE* p;
public:
        File_handle(const char* pp, const char* r) :p{fopen(pp,r)}
                { if (p==nullptr) throw File_error(pp,r); }
        File_handle(const string& s, const char* r) :p {fopen(s.c_str(),r)}
                { if (p==nullptr) throw File_error(s,r); }
        ~File_handle() { fclose(p); }          // destructor
        // ...
};

void f(string s)
{
        File_handle fh {s, "r"};
        // use fh
}
// the use is simple and safe
```

Tips and Tricks

Console app not showing up in Qt [All platforms]

- If console application does not show up, make sure to check/enable **Run in Terminal** in **Build & Run** configuration.



Method: Deploy Configuration

Run configuration: console_app

Executable: C:\Users\bgarci77\Documents\Ben\build-pscore-Desktop_Qt_5_15_1_MinGW_64_bit-Debug\bin\console_app.exe

Command line arguments:

Working directory: ers\bgarci77\Documents\Ben\build-pscore-Desktop_Qt_5_15_1_MinGW_64_bit-Debug\bin

☐ Run in terminal

☑ Add build library search path to PATH

Console app not working in Qt Ubuntu Linux

- If console application does not show up, this is possibly because **Qt** is not able to work with the current **Linux terminal**.
    - To resolve, go to Tools->Options->Environment->System and select your current terminal.

Adding a new screen

1) **Create** the .hpp and .cpp file for the new screen in orchestra/application/screen.
    - Make sure to add the copyright notice
    - Make sure to add the correct header guards
        - Format: FOLDERNAME_FILENAME_FILEEXTENSION_
2) **Add** the new files to orchestra/application/CMakeLists.txt
3) **Add** the `#include <screeniface.hpp>` to your header file
4) **Inherit** from `screen::ScreenInterface` and **implement** `void show(std::promise<screen::display>* promise)` in your new class.
5) **Add** a new enum in orchestra/application/screen/screendefines.hpp for the new screen
6) In orchestra/application/flowcontroller.cpp, **add** the switch-case in `FlowController::show()` to show your new screen.

Excellent! Now your new screen can be transitioned from other screens by specifying your new enum in their promise parameter (i.e. `promise->set_value(screen::display::NEW_ENUM)`).

Note: For testing purposes, you can replace `screen::display nextScreen = screen::display::LOGIN;` with your screen enum to set it as the first screen. However, keep in mind that some screens require special initialization (e.g. using screen shared data).

Adding a new Core module

API creation

1) **Create** the module folder inside core/domain.
2) **Create** a CMakeLists.txt file and **specify** the following:
   - Project name
   - Library name and type
3) **Create** the interface folder inside core/domain/[module_folder].
4) **Create** the controller, data and view interfaces inside the interface folder.
5) **Add** the new files to the CMakeLists.txt of the new module.
6) **Add** the new module as subdirectory in core/ CMakeLists.txt file.

Controller

7) **Create** the .hpp and .cpp controller files for the new module in core/domain/[module_folder].
8) **Inherit** from `controller interface` and **implement** the pure virtual functions in your new controller.

View

9) **Add** the module screen.
   - **See** *Adding a new screen* section of this document.
10) **Inherit** from module `view interface` and **implement** the pure virtual functions in your new screen.

Data Provider

11) **Create** the .hpp and .cpp file for the new data provider in orchestra/datamanager.
12) **Add** the new files to orchestra/datamanager/CMakeLists.txt
13) **Add** the `#include <domain/[module_folder]/interface/[module]dataif.hpp>` to your header file
14) **Inherit** from `[module]dataInterface` and implement the functions.

Voila! You're all set to finish the implementation.

Note: For all created files, make sure to:

- **Add** the copyright notice
- **Add** the correct header guards
  - Format: FOLDERNAME_FILENAME_FILEEXTENSION_

Creating a release

1) **Create** the latest master.
2) **Do** `git log --pretty=%s vx.x.x..HEAD` **-** *where vx.x.x is the current version.*
   - Copy the result, we will need it for the next steps.
3) **Create** a tag
   - `git tag vMAJOR.MINOR.REV(.HOTFIX) -` *e.g.* `git tag v1.0.0`
4) **Push** the tag
   - `git push origin vx.x.x` **-** *where vx.x.x is the new version.*
5) **Go to** *github.com -> code -> tags* and **find** the *tag* that you just created.
6) On the tag page, **click** *Edit release*.
7) **Paste** the result from step 2 and **arrange** according to the following format:

   -
     ```
     ### Upgrade Steps
     - [ACTION REQUIRED]
     -
     ### Breaking Changes
     -
     ### New Features
     -
     ### Bug Fixes
     -
     ### Improvements
     -
     ### Other Changes
     -
     ```
8) **Click** on Update release
   - Note: **Tick** the *This is a pre-release* checkbox when applicable.