연구실 세미나 : 프로그래밍 교육

Programming Material : OpenCV #1

Amylose

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연구실 세미나 : 프로그래밍 교육

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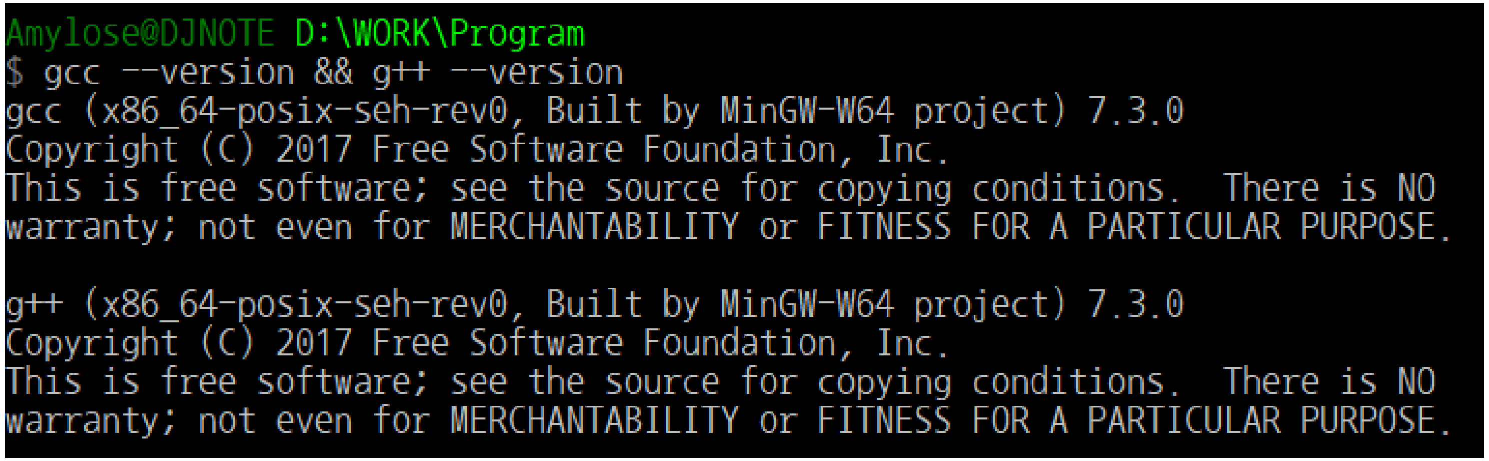
- Development Environment
  - Compiler : Mingw-W64 GCC ver 7.3.0 or higher.
    - Confirmation mathod : in command prompt
      > gcc --version && g++ --version



```
Amylose@DJNOTE D:\WORK\Program
$ gcc --version && g++ --version
gcc (x86_64-posix-seh-rev0, Built by MinGW-W64 project) 7.3.0
Copyright (C) 2017 Free Software Foundation, Inc.
This is free software; see the source for copying conditions.  There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.

g++ (x86_64-posix-seh-rev0, Built by MinGW-W64 project) 7.3.0
Copyright (C) 2017 Free Software Foundation, Inc.
This is free software; see the source for copying conditions.  There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
```

  - OpenCV : Version 3.4.2 or higher
    - IN $OPENCV_LIB_PATH/, Confirm library file number, ex) libopencv_core### <- confirm ###

- Options
  - IDE : Code::Blocks
    - 메모장이나, Notepad++같은 Editor을 사용해도 좋으나, 프로그램 빌드할 때, 불편하므로 Code::Blocks를 추천

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- OpenCV Learning Method
  - 기본 예제를 따라하기 (Study the basic example)
  - 각 예제별로 공통점 및 차이점을 알아보기
  - 기본 예제 코드 내에 필요한 함수 추가해보기
  - 필요한 기본 예제들끼리 결합하여 응용하기

- cv::Mat (Major Objects in OpenCV)
  - Image handle(Storage) class in opencv (So very Important)
  - Usage : Store Images in memory, Image Process
  - OpenCV를 잘 활용하기 위해서는 "cv::Mat"클래스의 이해가 필수적임.
  - OpenCV Document 혹은 Blog를 잘 활용하여 필요할 때마다 용례를 학습할 수 있어야 함.

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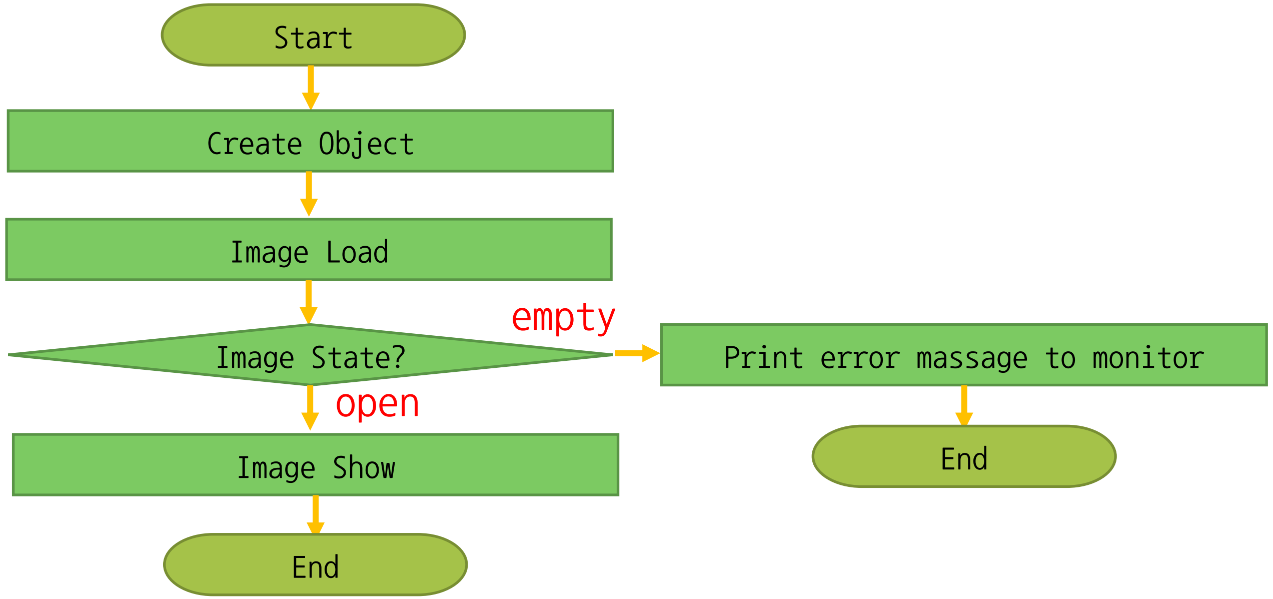
Programming Material : OpenCV #1

- Program according to the following
  - Use C++ language and OpenCV Library
  - Develop a program that shows the image files you like.
- Hint
  - OpenCV Document : https://docs.opencv.org/
  - Class : cv::Mat, cv::imread, cv::imshow, cv::waitkey
- Flow Chart



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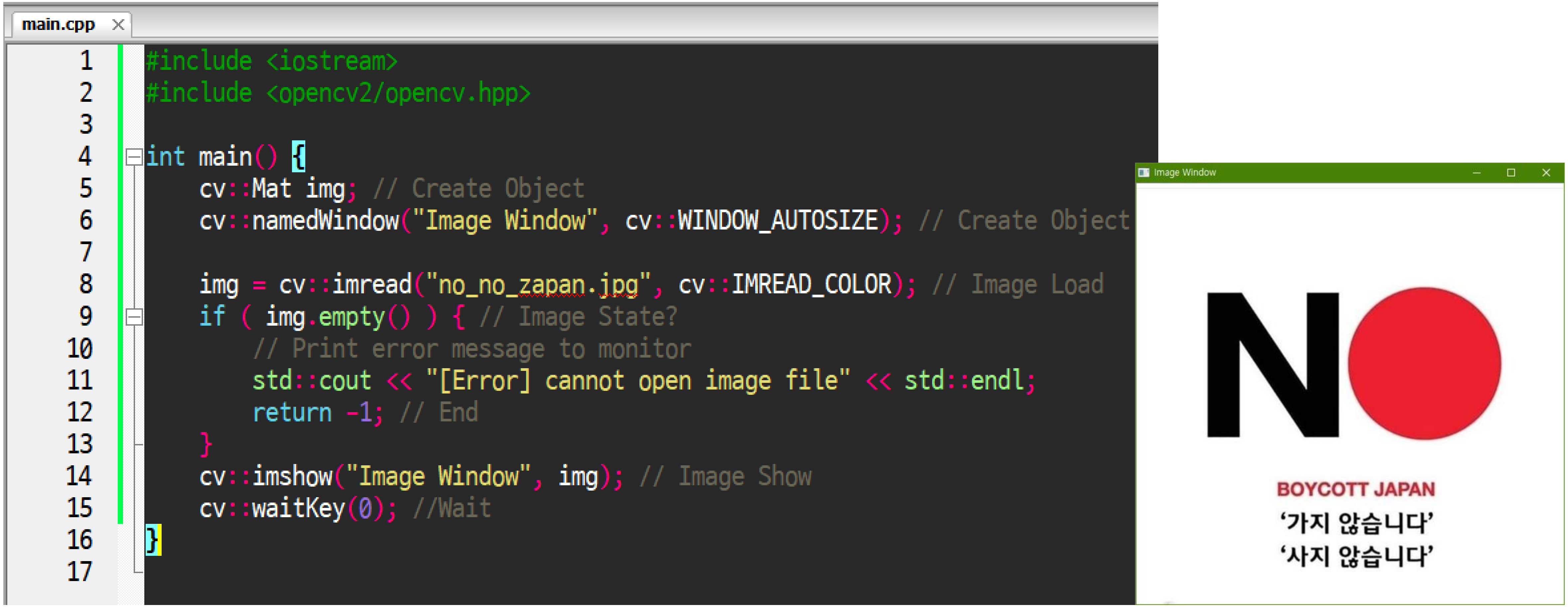
- Answer Example



main.cpp

```cpp
#include <iostream>
#include <opencv2/opencv.hpp>

int main() {
    cv::Mat img; // Create Object
    cv::namedWindow("Image Window", cv::WINDOW_AUTOSIZE); // Create Object

    img = cv::imread("no_no_zapan.jpg", cv::IMREAD_COLOR); // Image Load
    if ( img.empty() ) { // Image State?
        // Print error message to monitor
        std::cout << "[Error] cannot open image file" << std::endl;
        return -1; // End
    }
    cv::imshow("Image Window", img); // Image Show
    cv::waitKey(0); //Wait
}
```

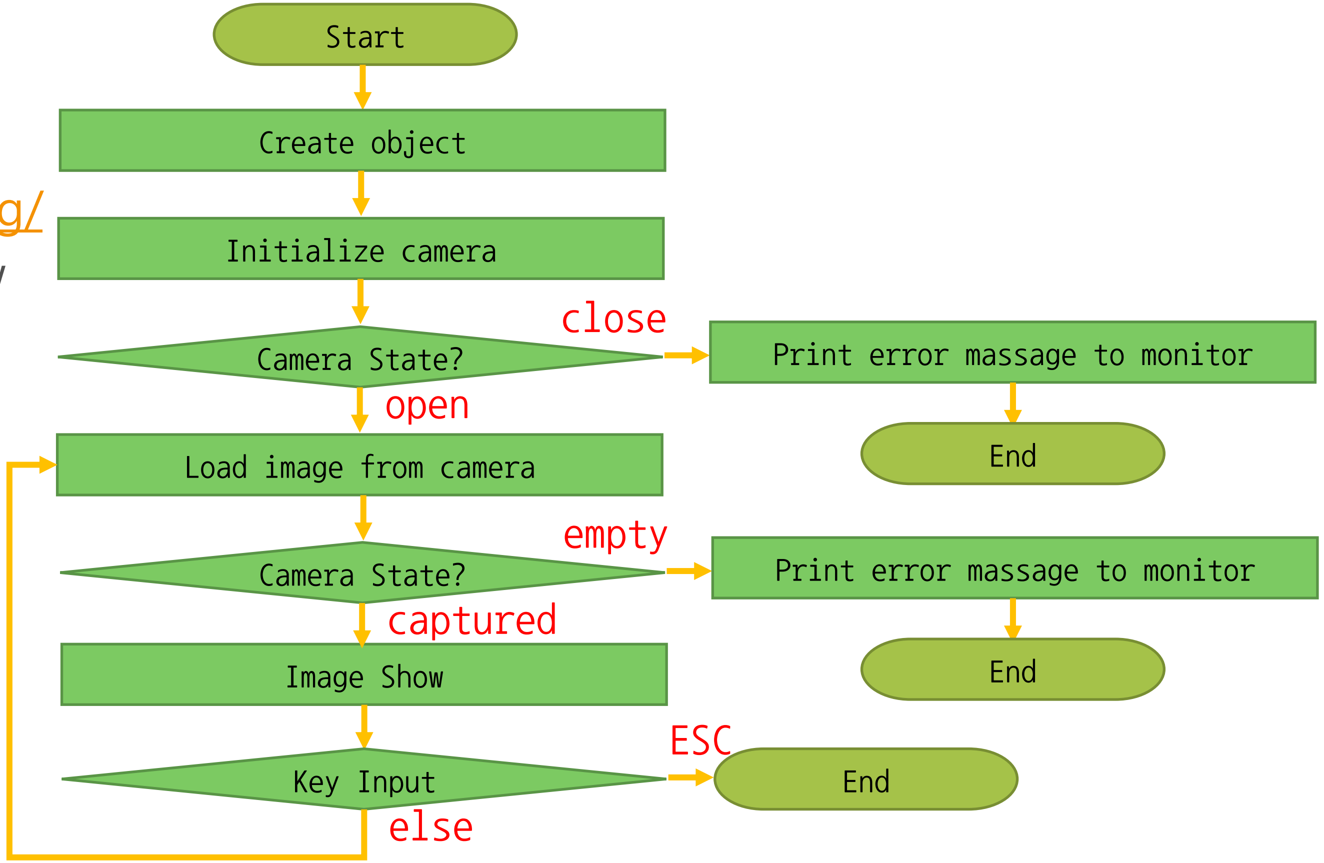
서보건 각도 실시간 자동측정 및 가압력 보정기술 개발

Programming Material : OpenCV #1

- Program according to the following
  - ➢ Use C++ language and OpenCV Library
  - ➢ Develop a program to show images of webcams.

- Hint
  - ➢ OpenCV Document : https://docs.opencv.org/
  - ➢ Class : cv::Mat, cv::VideoCapture, cv::imshow

- Flow Chart



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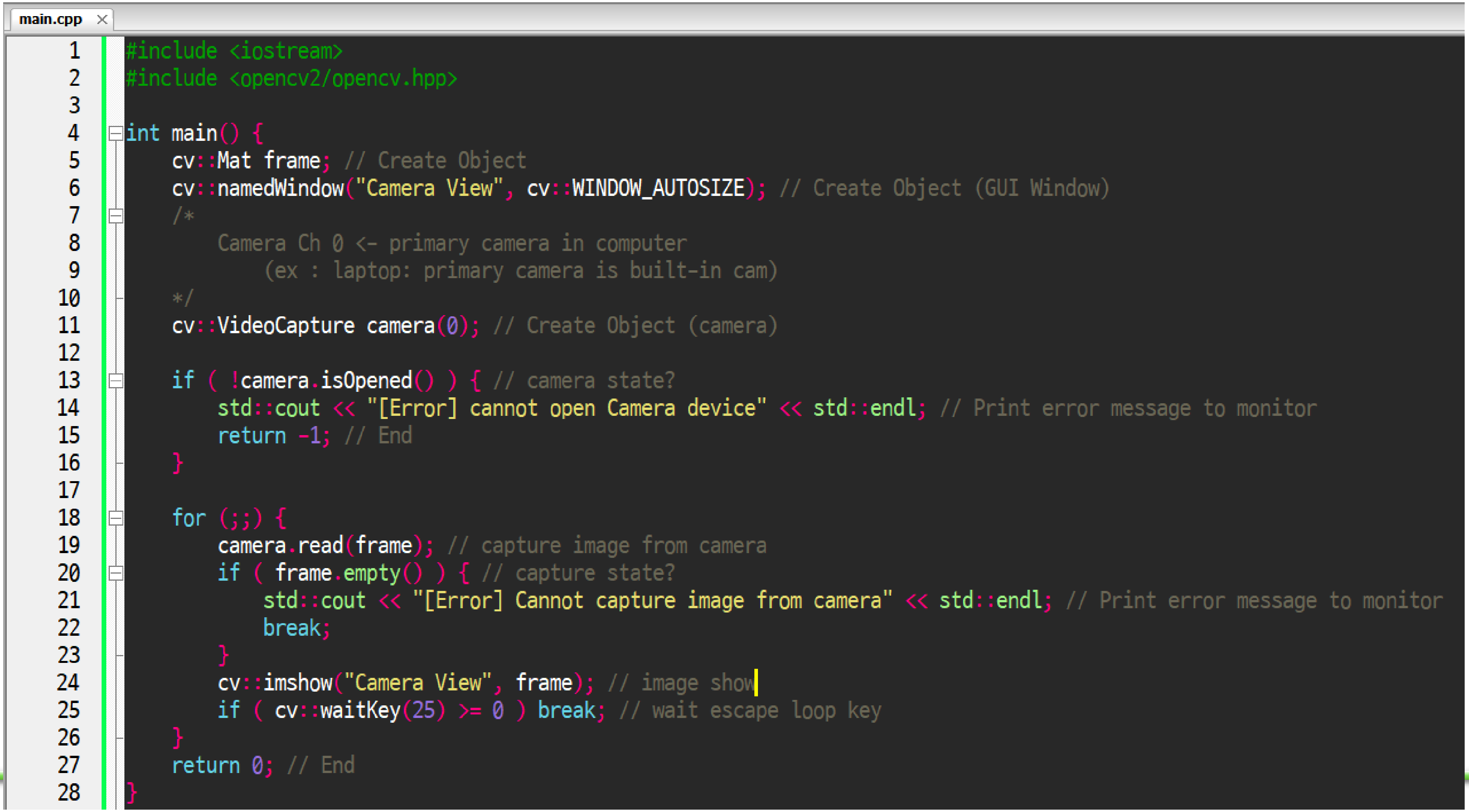
- Answer Example



```cpp
#include <iostream>
#include <opencv2/opencv.hpp>

int main() {
    cv::Mat frame; // Create Object
    cv::namedWindow("Camera View", cv::WINDOW_AUTOSIZE); // Create Object (GUI Window)
    /*
        Camera Ch 0 <- primary camera in computer
            (ex : laptop: primary camera is built-in cam)
    */
    cv::VideoCapture camera(0); // Create Object (camera)

    if ( !camera.isOpened() ) { // camera state?
        std::cout << "[Error] cannot open Camera device" << std::endl; // Print error message to monitor
        return -1; // End
    }

    for (;;) {
        camera.read(frame); // capture image from camera
        if ( frame.empty() ) { // capture state?
            std::cout << "[Error] Cannot capture image from camera" << std::endl; // Print error message to monitor
            break;
        }
        cv::imshow("Camera View", frame); // image show
        if ( cv::waitKey(25) >= 0 ) break; // wait escape loop key
    }
    return 0; // End
}
```