OpenCV Quick Start Guide

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Topics to be discussed

1. Introduction to OpenCV
2. Downloading and Installing OpenCV
3. How to Create VC++ Project
4. Configuring Visual C++ 2010 for OpenCV
5. OpenCVDemo

Introduction to OpenCV

What is OpenCV?

Introduction to OpenCV

- OpenCV is an open source computer vision library originally developed by Intel Corporation.
- OpenCV provides easy to use APIs for Image Processing / Computer Vision / Machine Learning algorithms.
- OpenCV also provides support for
  - Basic GUI for loading / saving / viewing images / videos being processed
  - Real-time mono / stereo video capture and subsequent processing
- The library code is highly optimized for native C/C++/Python development.
- OpenCV has been ported for Windows/Linux/Android/iOS platforms

Downloading and Installing OpenCV

Welcome to OpenCV 2.4.6

Downloading and Installing OpenCV

- OpenCV is supported in both Windows and Linux platforms.
- The OpenCV 2.4.6 for windows can be downloaded from the following location
  - http://opencv.org/downloads.html
  - http://sourceforge.net/projects/opencvlibrary/files/opencv-win/2.4.6
  - Install OpenCV using the downloaded executable
    - OpenCV-2.4.6.0.exe

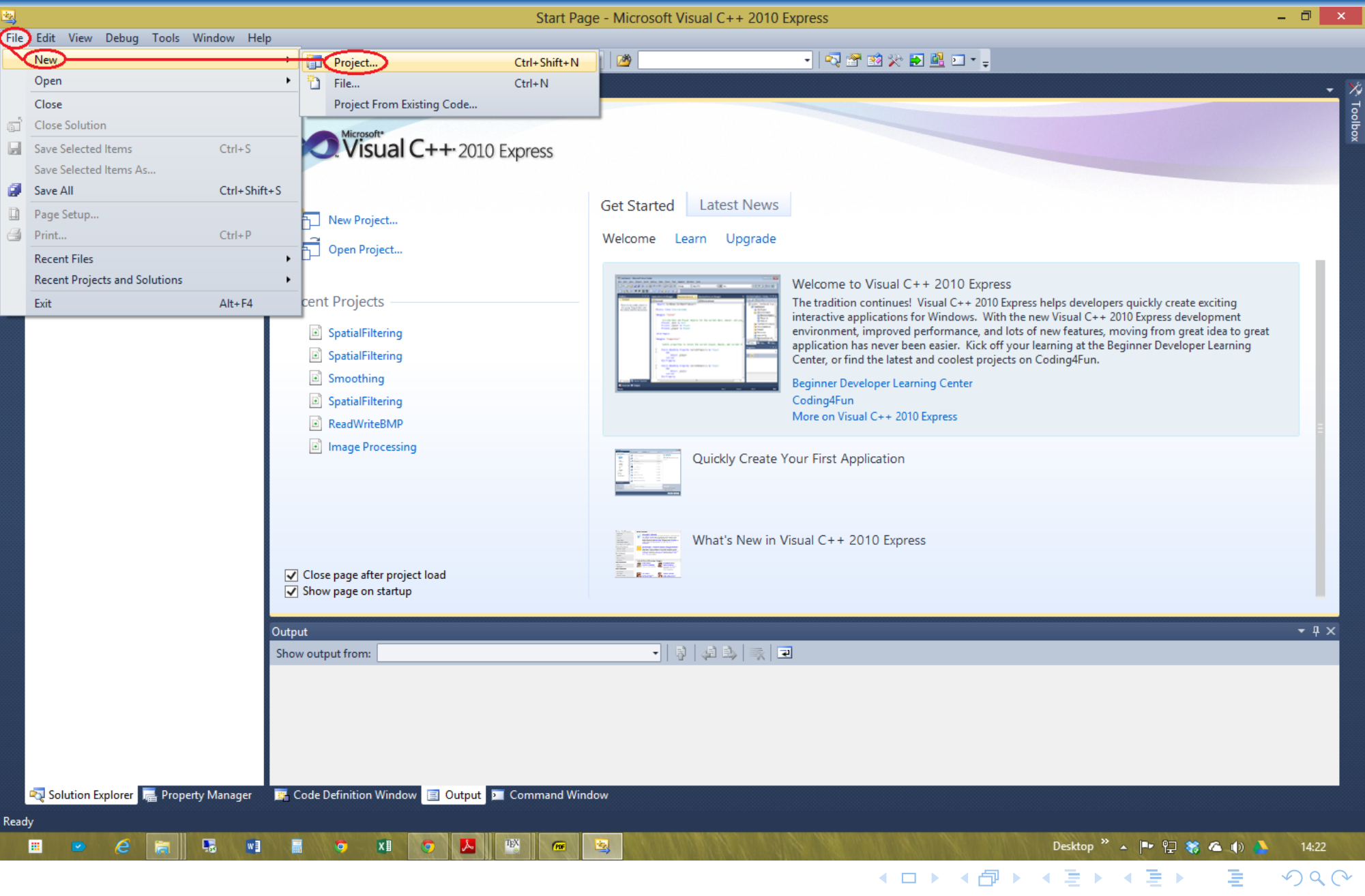
Microsoft Visual C++ Development Environment

- This tutorial will only discuss installation / configuration for the Windows platform using Microsoft Visual C++ as the preferred development environment.
- This tutorial assumes basic level of familiarity with C/C++ programming on MS VC++ IDE.
- You can get MS Visual C++ 2010 Express Edition here
  - http://www.microsoft.com/visualstudio/eng/downloads#d-2010-express
  - It's usable for 30 days without registration
  - Beyond 30 days you must register the product at Microsoft free of cost
- Create a new VC++ project as Win32 console application

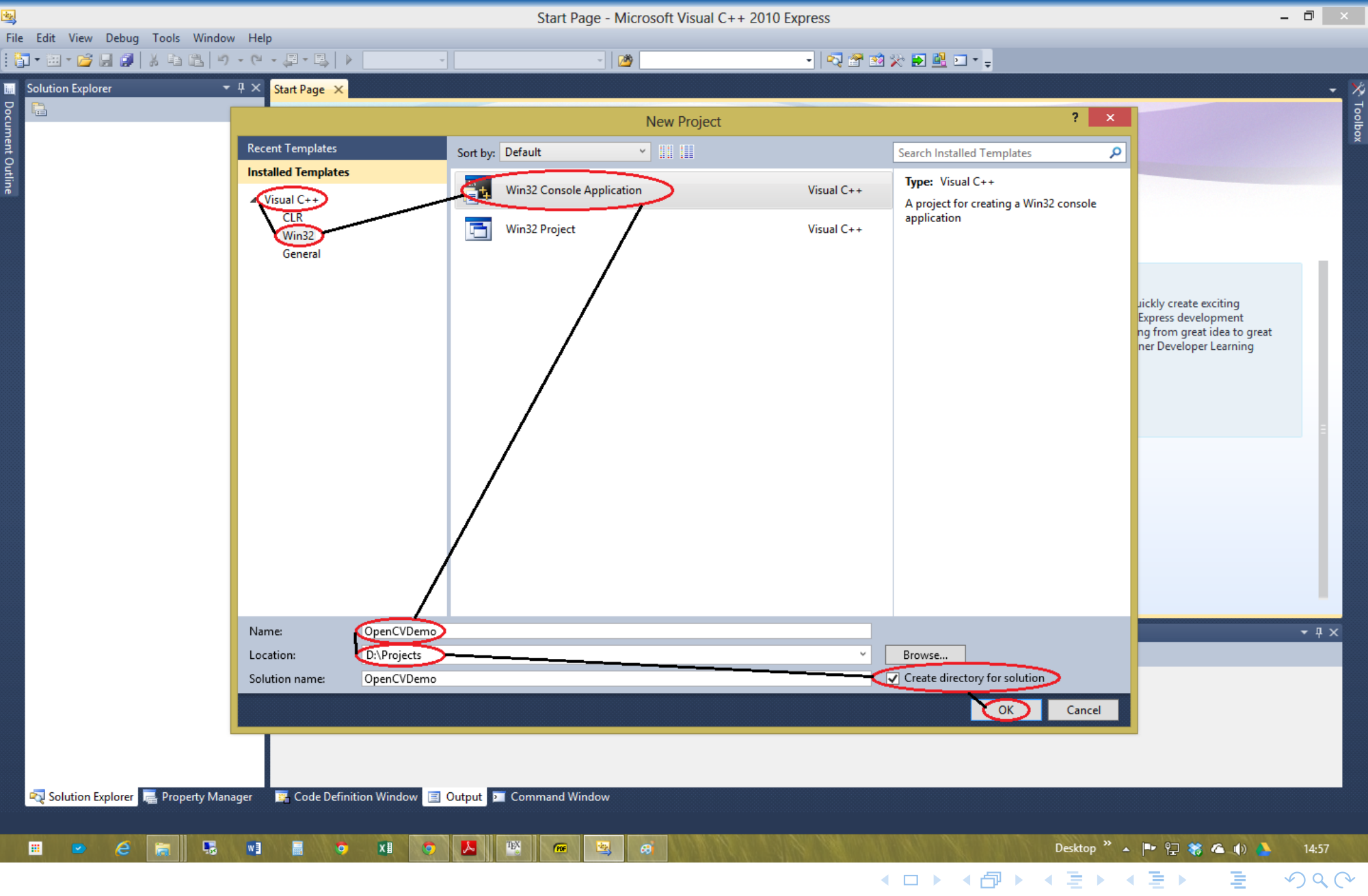
How to Create VC++ Project

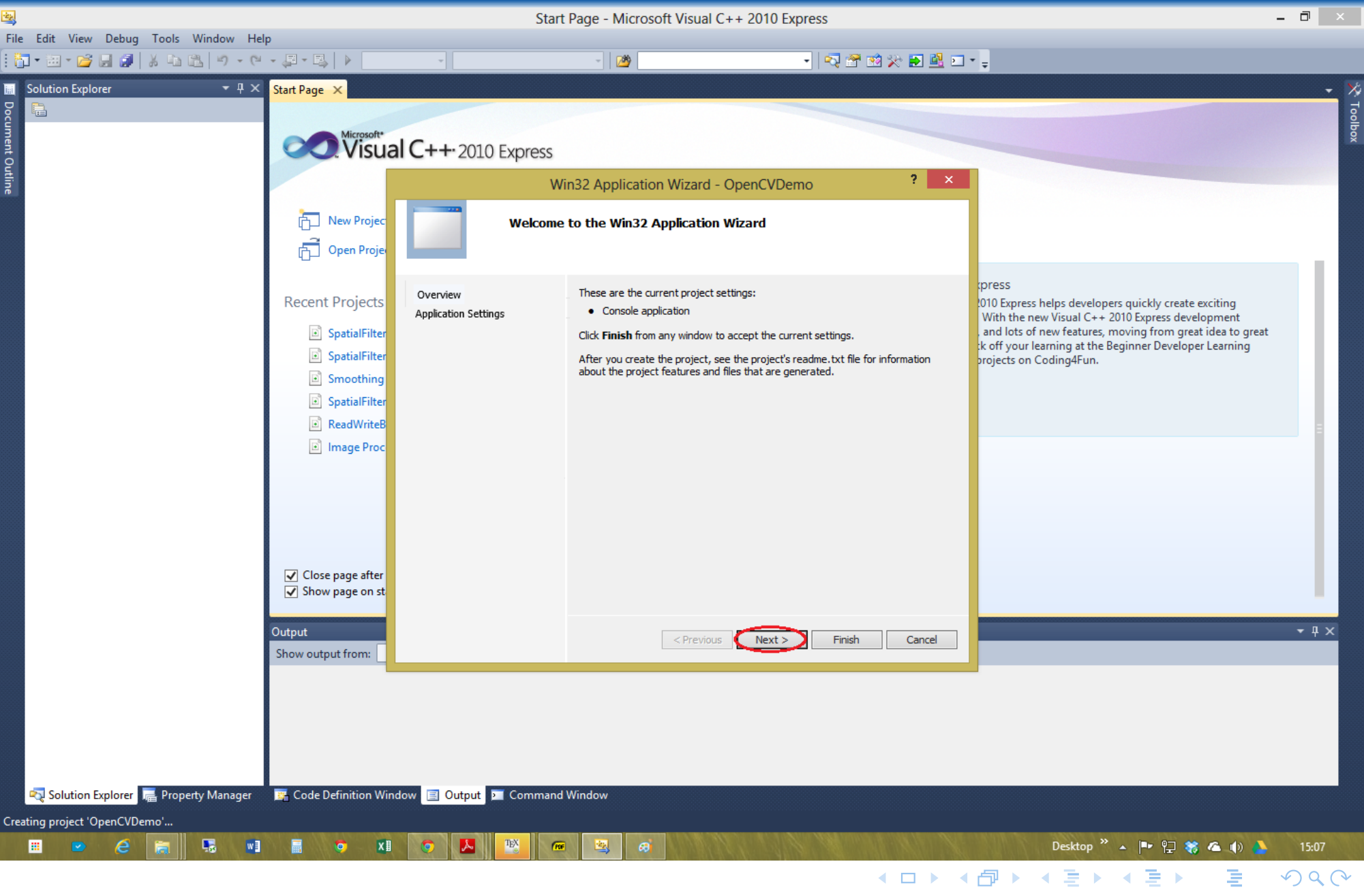
For a Win 32 Console Application

File → New → Project

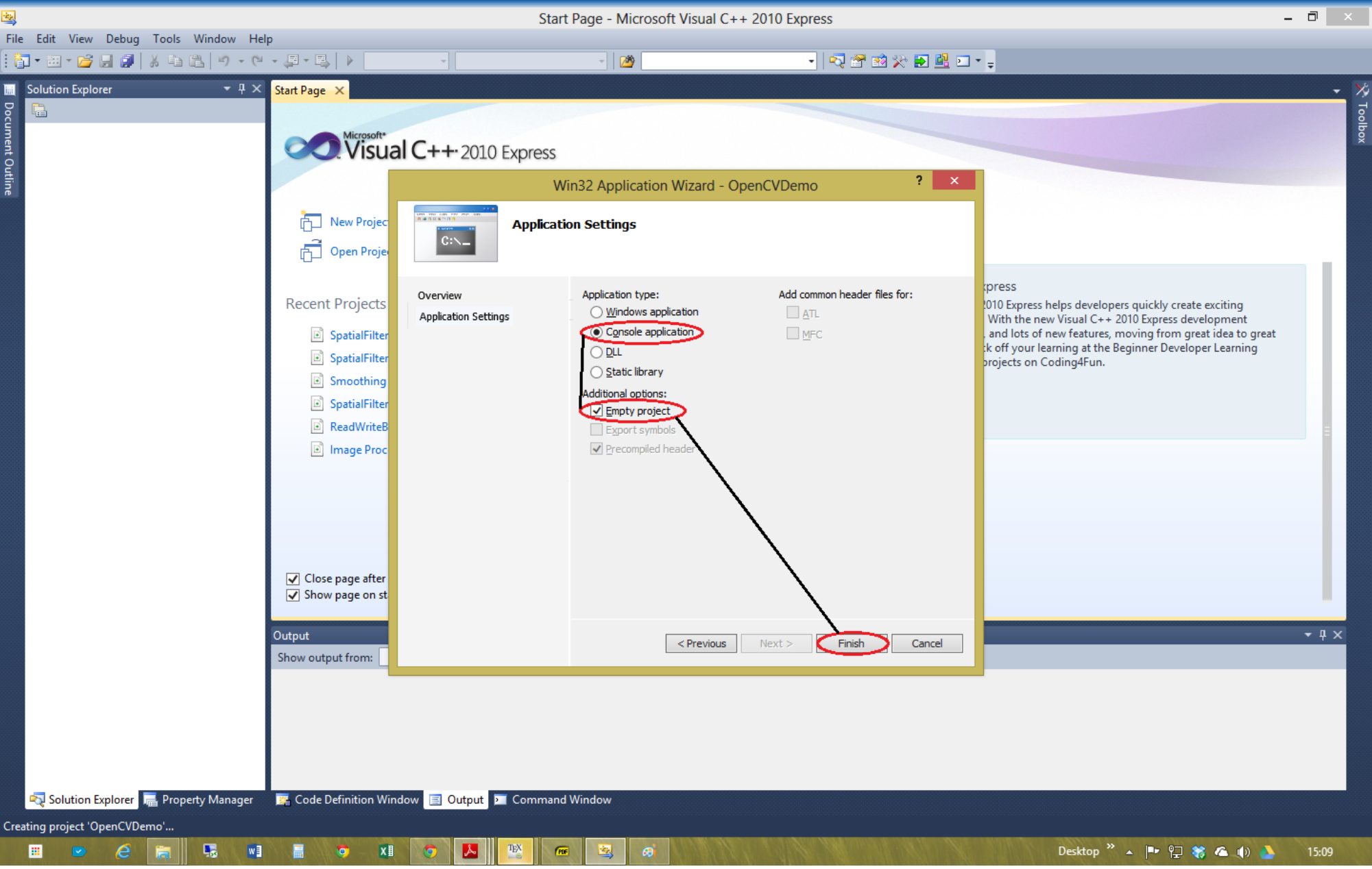


Visual C++ → Win32 → Win32 Console → Name → Location → Create directory for solution → OK

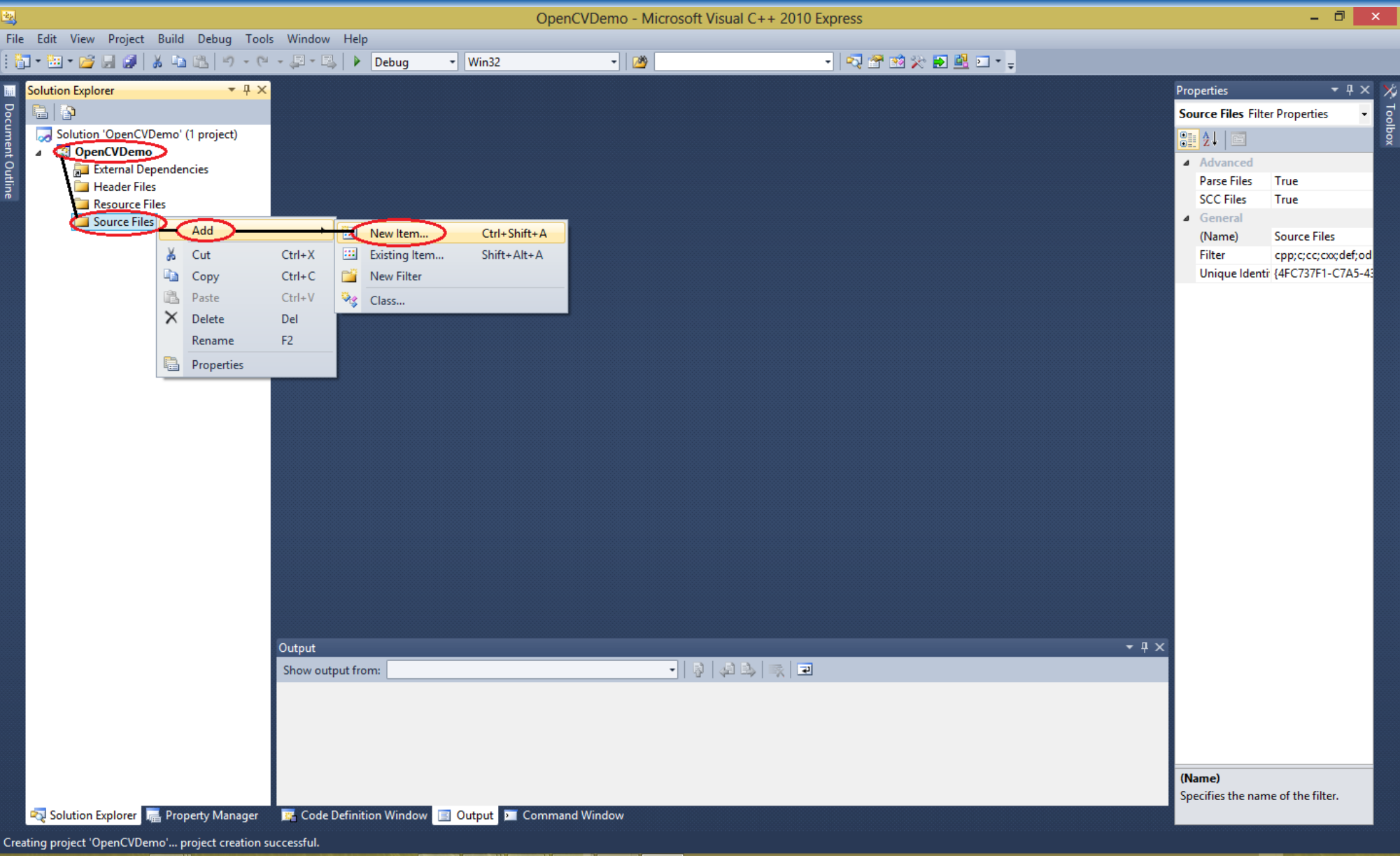



Start Page - Microsoft Visual C++ 2010 Express
File Edit View Debug Tools Window Help
Solution Explorer
Start Page
Microsoft Visual C++ 2010 Express
Win32 Application Wizard - OpenCVDemo
Welcome to the Win32 Application Wizard
Overview
Application Settings
These are the current project settings:
Console application
Click Finish from any window to accept the current settings.
After you create the project, see the project's readme.txt file for information about the project features and files that are generated.
< Previous
Next >
Finish
Cancel
Recent Projects
Output
Show output from:
Solution Explorer
Property Manager
Code Definition Window
Output
Command Window
Creating project 'OpenCVDemo'...
Desktop
15:07

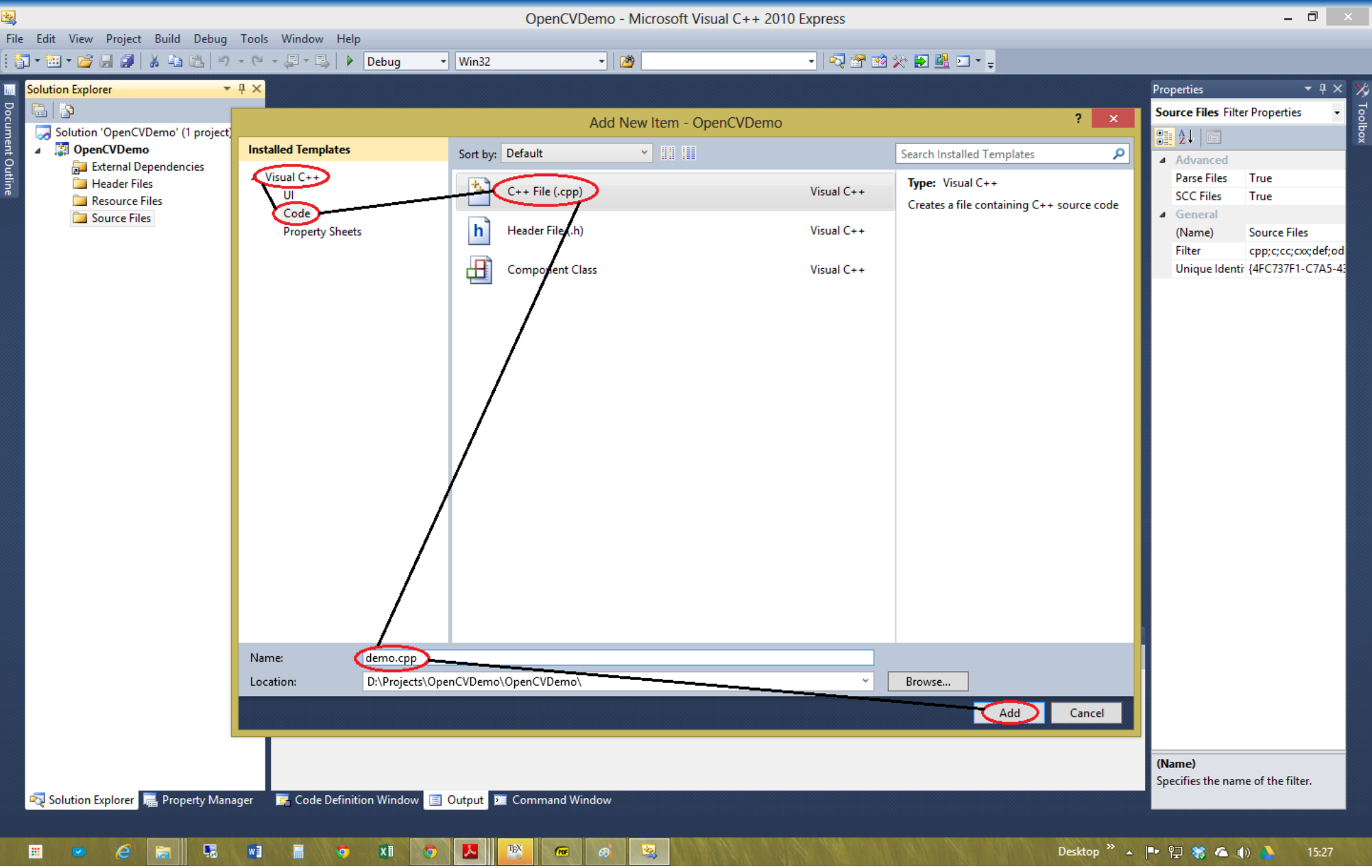
Console application → Empty project → Finish

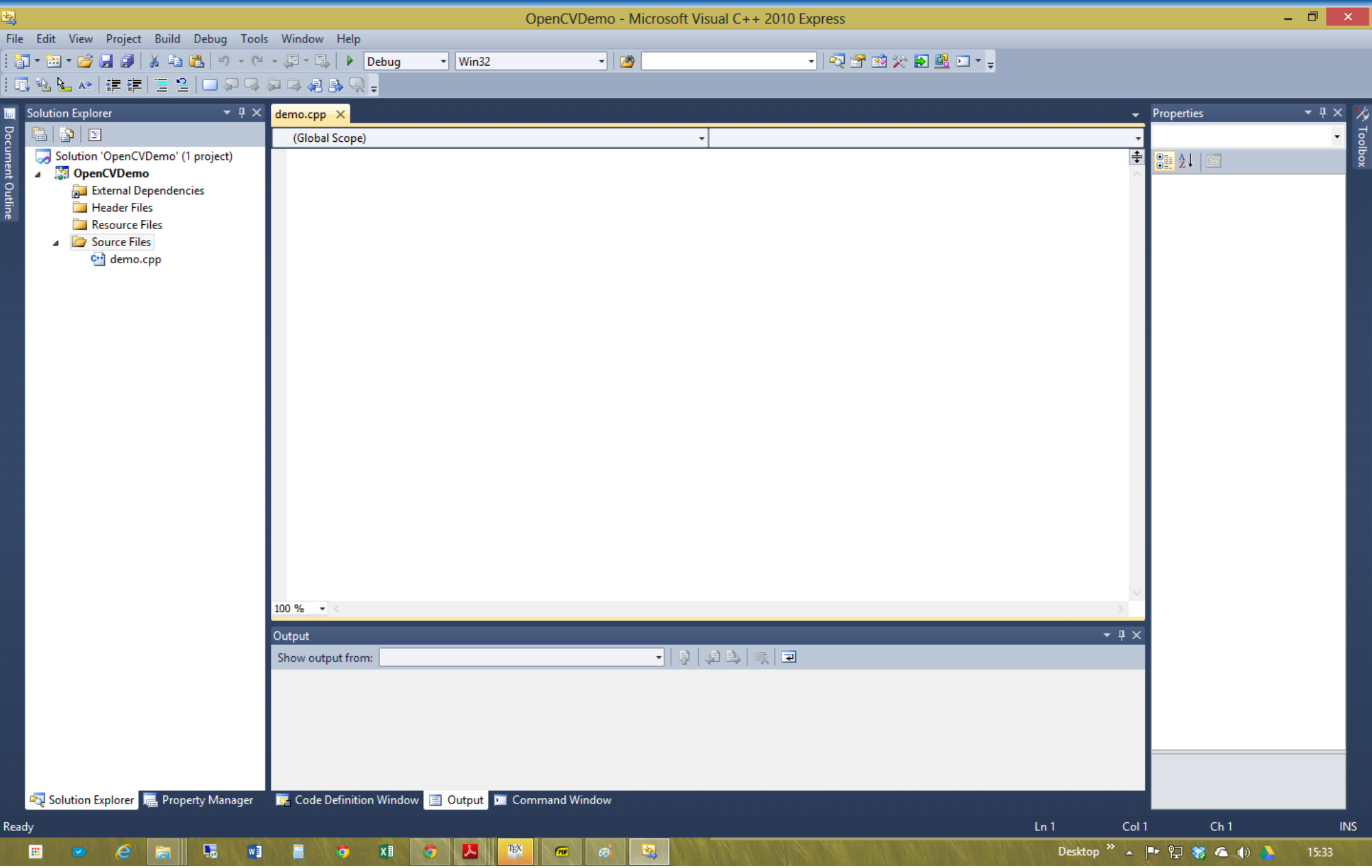


OpenCVDemo → Source Files → Add → New Item



Visual C++ → Code → C++ File (.cpp) → Name → Add




OpenCVDemo - Microsoft Visual C++ 2010 Express
File Edit View Project Build Debug Tools Window Help
Debug
Win32
Solution Explorer
Solution 'OpenCVDemo' (1 project)
OpenCVDemo
External Dependencies
Header Files
Resource Files
Source Files
demo.cpp
demo.cpp
(Global Scope)
100 %
Output
Show output from:
Properties
Toolbox
Document Outline
Solution Explorer
Property Manager
Code Definition Window
Output
Command Window
Ready
Ln 1
Col 1
Ch 1
INS
Desktop
15:33

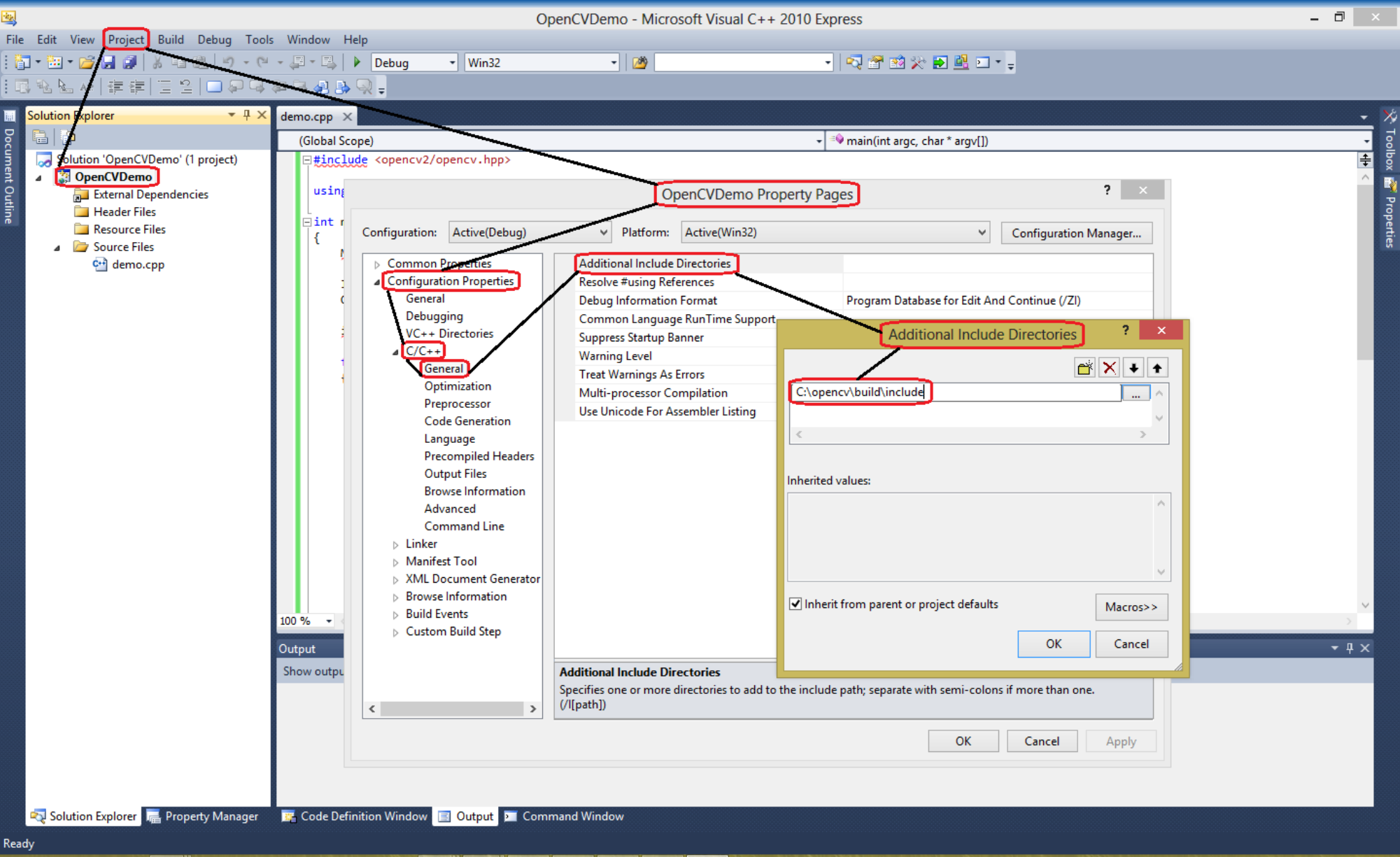
Configuring Visual C++ 2010 for OpenCV

Configuring VC++ Project for OpenCV

- Start Microsoft Visual Studio / C++ 2010
  - Create a new VC++ project as Win32 console application
    or
  - Open any VC++ Project
- It's a four step process
  - Configure the header file path
  - Configure the library file path
  - Add the list of library dependencies
  - Select Static Runtime Library

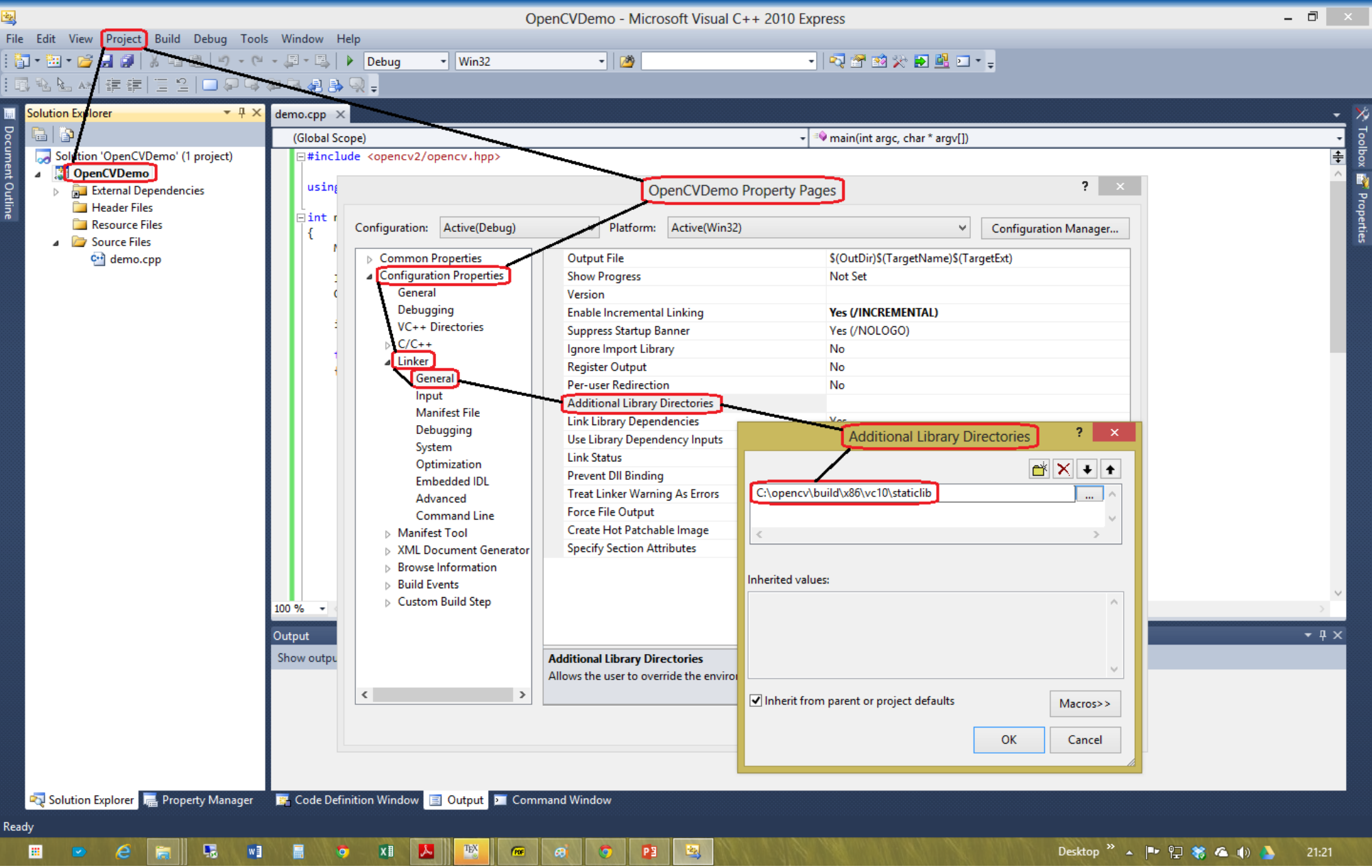
Configure Header Path

- Open menu item Project → "Project Name" Properties
- Select Configuration Properties → C/C++ → General → Additional Include Directories
  - Add path "C:\opencv\build\include" to the list


OpenCVDemo - Microsoft Visual C++ 2010 Express
File Edit View Project Build Debug Tools Window Help
Debug
Win32
Solution Explorer
Solution 'OpenCVDemo' (1 project)
OpenCVDemo
External Dependencies
Header Files
Resource Files
Source Files
demo.cpp
(Global Scope)
main(int argc, char * argv[])
#include <opencv2/opencv.hpp>
OpenCVDemo Property Pages
Configuration: Active(Debug)
Platform: Active(Win32)
Configuration Manager...
Common Properties
Configuration Properties
General
Debugging
VC++ Directories
C/C++
General
Optimization
Preprocessor
Code Generation
Language
Precompiled Headers
Output Files
Browse Information
Advanced
Command Line
Linker
Manifest Tool
XML Document Generator
Browse Information
Build Events
Custom Build Step
Additional Include Directories
Resolve #using References
Debug Information Format
Program Database for Edit And Continue (/ZI)
Common Language RunTime Support
Suppress Startup Banner
Warning Level
Treat Warnings As Errors
Multi-processor Compilation
Use Unicode For Assembler Listing
Additional Include Directories
C:\opencv\build\include
Inherited values:
Inherit from parent or project defaults
Macros>>
OK
Cancel
Additional Include Directories
Specifies one or more directories to add to the include path; separate with semi-colons if more than one.
(/I[path])
OK
Cancel
Apply
Output
Solution Explorer
Property Manager
Code Definition Window
Output
Command Window
Ready

Configure Library Path

- Open menu item Project → "Project Name" Properties
- Select Configuration Properties → Linker → General → Additional Library Directories
  - Add path "C:\opencv\build\x86\vc10\staticlib" to the list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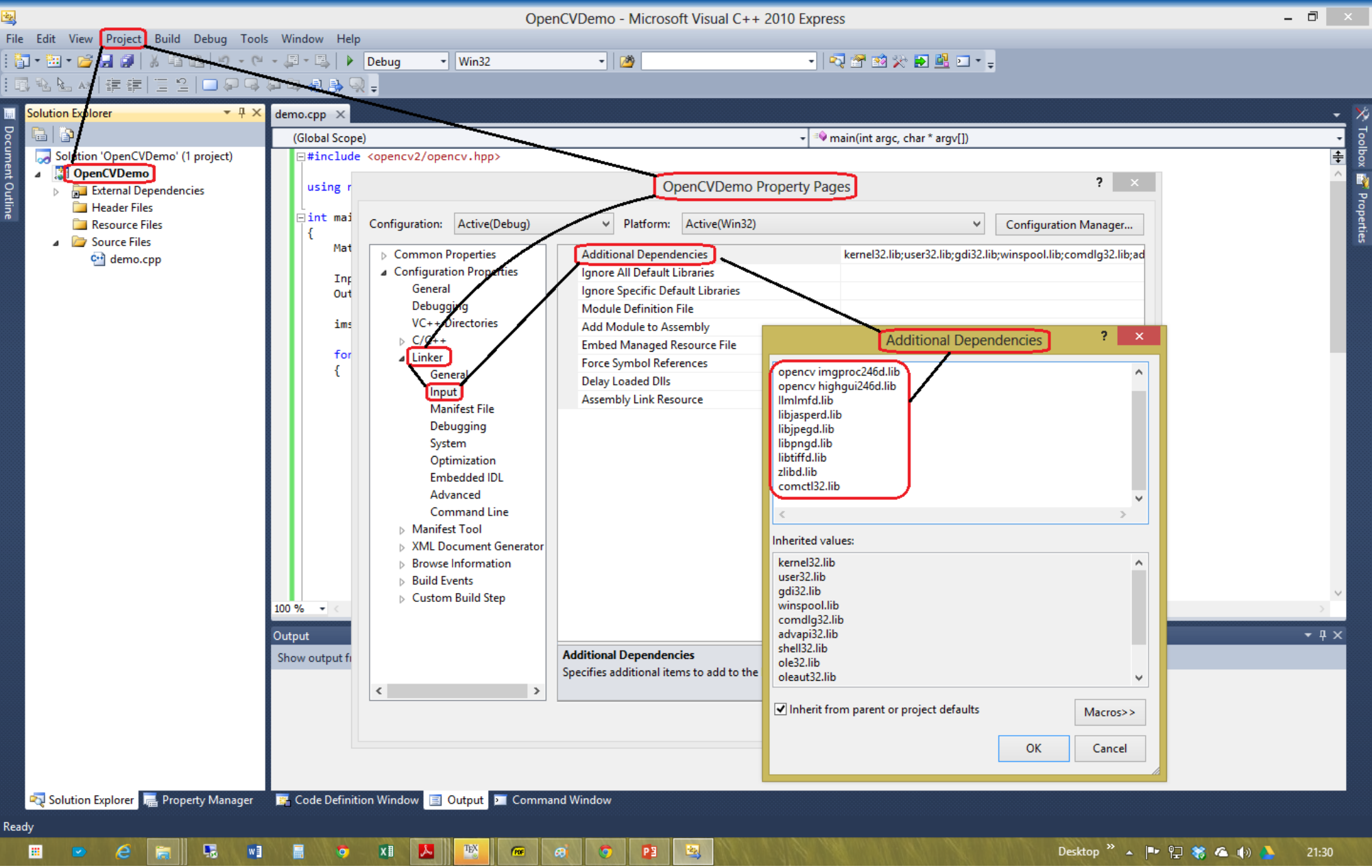
Linker
General
Input
Manifest File
Debugging
System
Optimization
Embedded IDL
Advanced
Command Line
Manifest Tool
XML Document Generator
Browse Information
Build Events
Custom Build Step
Output File $(OutDir)$(TargetName)$(TargetExt)
Show Progress Not Set
Version
Enable Incremental Linking Yes (/INCREMENTAL)
Suppress Startup Banner Yes (/NOLOGO)
Ignore Import Library No
Register Output No
Per-user Redirection No
Additional Library Directories
Link Library Dependencies
Use Library Dependency Inputs
Link Status
Prevent Dll Binding
Treat Linker Warning As Errors
Force File Output
Create Hot Patchable Image
Specify Section Attributes
Additional Library Directories
Allows the user to override the enviro
Additional Library Directories
C:\opencv\build\x86\vc10\staticlib
Inherited values:
Inherit from parent or project defaults
Macros>>
OK
Cancel
Output
Solution Explorer
Property Manager
Code Definition Window
Output
Command Window
Ready

Configure Library Dependencies

- Open menu item Project → "Project Name" Properties
- Select Configuration Properties → Linker → Input → Additional Dependencies
  - Add the following to the list
    - opencv_core246d.lib
    - opencv_imgproc246d.lib
    - opencv_highgui246d.lib
    - IlmImfd.lib
    - libjasperd.lib
    - libjpegd.lib
    - libpngd.lib
    - libtiffd.lib
    - zlibd.lib
    - comctl32.lib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Optimization
Embedded IDL
Advanced
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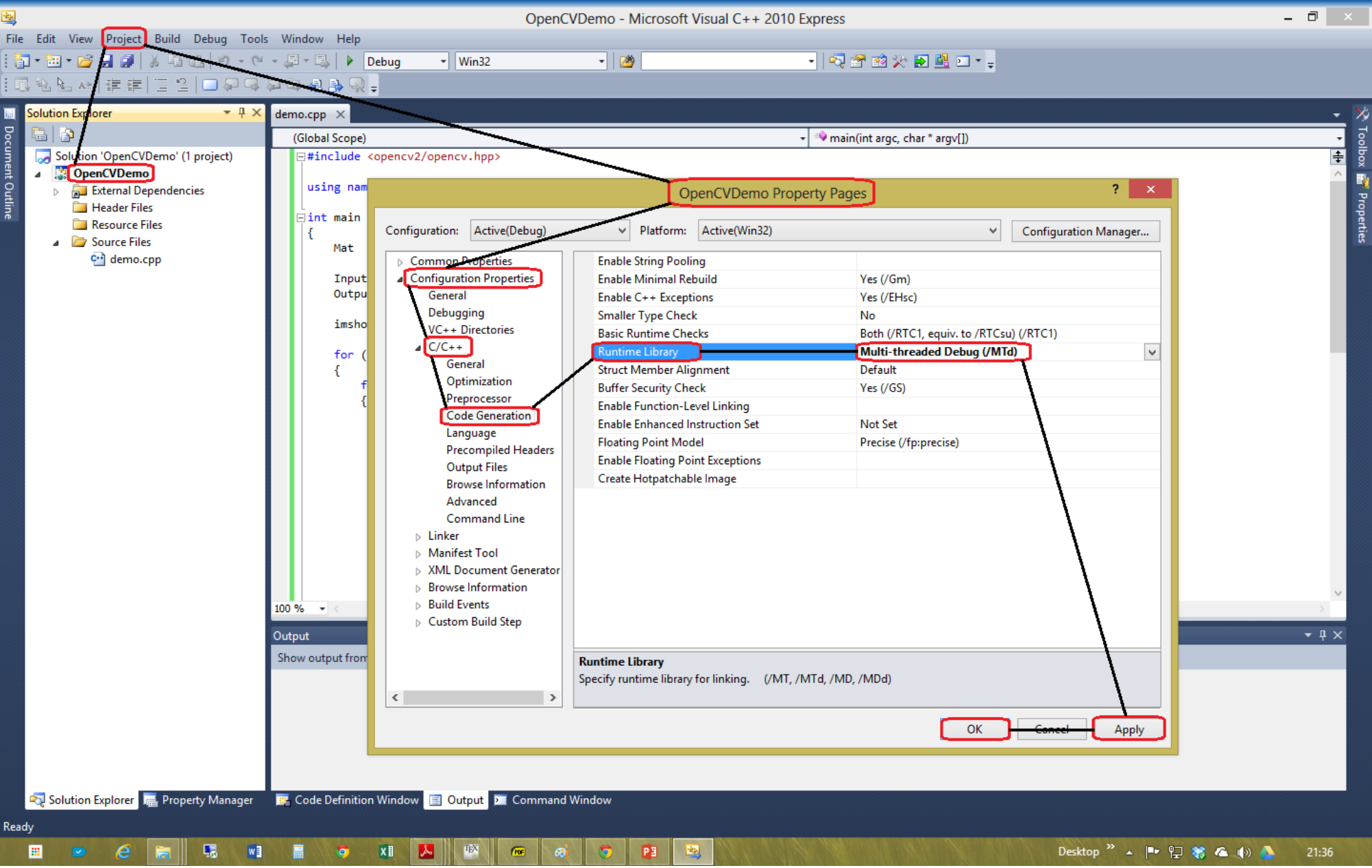
Manifest Tool
XML Document Generator
Browse Information
Build Events
Custom Build Step
Additional Dependencies
kernel32.lib;user32.lib;gdi32.lib;winspool.lib;comdlg32.lib;ad
Ignore All Default Libraries
Ignore Specific Default Libraries
Module Definition File
Add Module to Assembly
Embed Managed Resource File
Force Symbol References
Delay Loaded Dlls
Assembly Link Resource
Additional Dependencies
Specifies additional items to add to the
Additional Dependencies
opencv imgproc246d.lib
opencv highgui246d.lib
IlmImfd.lib
libjasperd.lib
libjpegd.lib
libpngd.lib
libtiffd.lib
zlibd.lib
comctl32.lib
Inherited values:
kernel32.lib
user32.lib
gdi32.lib
winspool.lib
comdlg32.lib
advapi32.lib
shell32.lib
ole32.lib
oleaut32.lib
Inherit from parent or project defaults
Macros>>
OK
Cancel
Output
Solution Explorer
Property Manager
Code Definition Window
Output
Command Window
Ready
Desktop
21:30

Selecting Static Runtime Library

- Open menu item Project → "Project Name" Properties
- Select Configuration Properties → C/C++ → Code Generation → Runtime Library
  - From the drop down menu select
  - Multi-threaded Debug (/MTd)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#include <opencv2/opencv.hpp>
using nam
int main
{
Mat
Input
Outpu
imsho
for (
{
100 %
Output
Show output from
OpenCVDemo Property Pages
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Platform: Active(Win32)
Configuration Manager...
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Advanced
Command Line
Linker
Manifest Tool
XML Document Generator
Browse Information
Build Events
Custom Build Step
Enable String Pooling
Enable Minimal Rebuild Yes (/Gm)
Enable C++ Exceptions Yes (/EHsc)
Smaller Type Check No
Basic Runtime Checks Both (/RTC1, equiv. to /RTCsu) (/RTC1)
Runtime Library Multi-threaded Debug (/MTd)
Struct Member Alignment Default
Buffer Security Check Yes (/GS)
Enable Function-Level Linking
Enable Enhanced Instruction Set Not Set
Floating Point Model Precise (/fp:precise)
Enable Floating Point Exceptions
Create Hotpatchable Image
Runtime Library
Specify runtime library for linking. (/MT, /MTd, /MD, /MDd)
OK
Cancel
Apply
Solution Explorer
Property Manager
Code Definition Window
Output
Command Window
Ready
Desktop
21:36

OpenCVDemo

Hands-on Demonstration Project

OpenCVDemo Project

- OpenCVDemo project demonstrates the basics of using OpenCV library to
  - Load a sample image from a file
  - Perform pixel by pixel image inversion
  - Display both input and output frame using the GUI
  - Save the output results to different files

Acknowledgment

Thanks to Sumandeep Banerjee.

Thank You... and Happy Coding