Team 1998 group project documentation

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Overview

This project uses OpenMP to write a parallel version of Conway's "Game of Life", and print the results of the iteration as images. In addition, this project also provides the function that generates the video based on images in jpg format.

Function analysis

void deleteArr()
Input data structure: No input data
Function describe: This function is used to delete the memory on heap of grid and new_grid
Output: No output

void deleteVect()
Input data structure: No input data
Function describe: This function is used to delete the memory on heap of grid in vector grid_list
Output: No output

int num_neighbours(int ii, int jj)
Input data structure: Two integers
Function describe: This function is used to calculate the alive neighbors of the cell whose position is (ii, jj).
Output: An integer

void do_iteration(void)
Input data structure: No input data
Function describe: This function is used to get the state of each cell after one iteration
Output: No output

void add2list()
Input data structure: No input data
Function describe: This function is used to add the array to the vector to store the state of each cell.
Output: No output data

void grid_to_jpg(bool grid[], int it)
Input data structure: one integer and an array
Function describe: This function is to generate the image according to the value of grid.
Output: No output data

inline const char* const BoolToString(bool b)
Input data structure: Boolean
Function describe: This function is used to convert Boolean value to string for output
Output: Character

void grid_to_file(int it)
Input data structure: An integer
Function describe: This function is used to generate the dat file according to the value of grid.
Output: No output data

bool Jpg_To_Video()
Input data structure: No input data
Function describe: This function is used to generate the avi video file according to all images in jpg format in the folder.
Output: Boolean

void pat1()
Input data structure: No input data
Function describe: This function is used to set the initial state of each cell. Some special types of patterns including still lifes, oscillators, and spaceships are used to set the cells' states.
Output: No output data

Environment

Compiler: visual studio 2019
OpenMP:3.0
Operating sys: Win 10
OpenCV: **opencv_world451.lib**

Execution

1. Download the openCV and add it to the visual studio
   (1) The URL to download the OpenCV
   https://sourceforge.net/projects/opencvlibrary/
   (2) Add opencv's bin directory to path.
   (3) Set platform target to x64
   (4) Add to Include Directories

   ```
   C:\Program Files\opencv\build\include\opencv2
   C:\Program Files\opencv\build\include
   ```

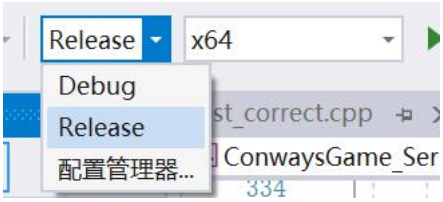
   (5) Add to Library Directories

   ```
   C:\Program Files\opencv\build\x64\vc14\lib
   ```

   (6) Add Additional Dependencies

   ```
   opencv_world451.lib
   ```

2. Change the debug mode to release mode



3. Create folders named img and img_test
4. Set the "imax", "jmax" and "max_steps" in ConwaysGame_P_new.cpp
5. Run the ConwaysGame_P_new.cpp