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GPU BENCHMARK

Project realised by *Panterele Roz*

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Chapter 1

Introduction

GPU is a programmable processor specialized for **rendering** all images on the computer's screen. A GPU performs parallel operations. Although it is used for **2D data** as well as for zooming and panning the screen, a GPU is essential for smooth decoding and **rendering of 3D animations and video**.

1.1 Context

- We choose to implement a GPU benchmark.A GPU benchmark is a test that helps you to compare the speed, performance, and efficiency of the GPU chipset.
- The component tested is Graphic Processing Unit, in particular, 2D Graphic Test, the result of this test being the time which is needed for painting and moving one element over the window.

1.2 Motivation

- The motivation behind choosing this GPU benchmark is that, for us, it seems to be the most interesting component for testing, with a lot of practical functionalities. GPU benchmarks are very used especially by gamers, in order to test the computer performance regarding graphic processing.
- Our benchmark isn't something completely new. This 2D graphic test was implemented and used many years ago.

State of the art

Two similar existing benchmarks which represent the source of our inspiration are: 3Dmark and GFXBENCH2D bechmarks.

3DMark is a computer benchmarking tool created and developed by UL, (formerly Futuremark), to determine the performance of a computer's 3D graphic rendering and CPU

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workload processing capabilities. Running 3DMark produces a 3DMark score, with higher numbers indicating better performance. The 3DMark measurement unit is intended to give a normalized mean for comparing different PC hardware configurations (mostly graphics processing units and central processing units), which proponents such as gamers and overclocking enthusiasts assert is indicative of end-user performance capabilities.

GfxBench2D is a benchmark test tool that measures the 2D performance of graphics cards. The tests are designed to look not only at how fast graphics cards are, but also why (i.e., which operations are fast, and which are slow). This is achieved by measuring the speed of the most common operations at various sizes.

The **GfxBench2D** benchmark have the following tests:

FILLRECT

This test measures the speed at which the graphics card can render rectangles with a solid colour. Multiple tests are performed with different rectangle sizes. Different rectangle sizes are tested since the performance may be limited by a combination of both the graphics card's rendering speed, and the speed at which the CPU can submit render commands across the bus to the graphics card.

BLITRECT

This test measures the speed at which the graphics card can copy (a.k.a. blit) a rectangular area from one bitmap to another. This is one of the most fundamental 2D graphics operations. Multiple tests are performed with different rectangle sizes. Different rectangle sizes are tested since the performance may be limited by a combination of both the graphics card's rendering speed, and the speed at which the CPU can submit render commands across the bus to the graphics card.

Design and implementation

Our application is the program that tests your computer performance: 2D graphic test. Result of this test is the time which is needed for painting and moving one or more elements over the window.

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```
@Override
public void actionPerformed(final java.awt.event.ActionEvent e) {
    int iterator =Integer.parseInt(iterations)*2;
    if (yPosition < 0 || yPosition > 490)
        speedByYAxis = -speedByYAxis;
    yPosition += speedByYAxis;
    if (yPosition == 0)
        i++;
    repaint();
    if (i == iterator) {
        timer.stop();
        timeout = System.currentTimeMillis() - timeout;
        jBasicTable.setValueAt(getTimeout(),  row: 13,  column: 1);

        setVisible(false);

    }
}
```

https://github.com/DanielaNicola/GPU-CO_Project

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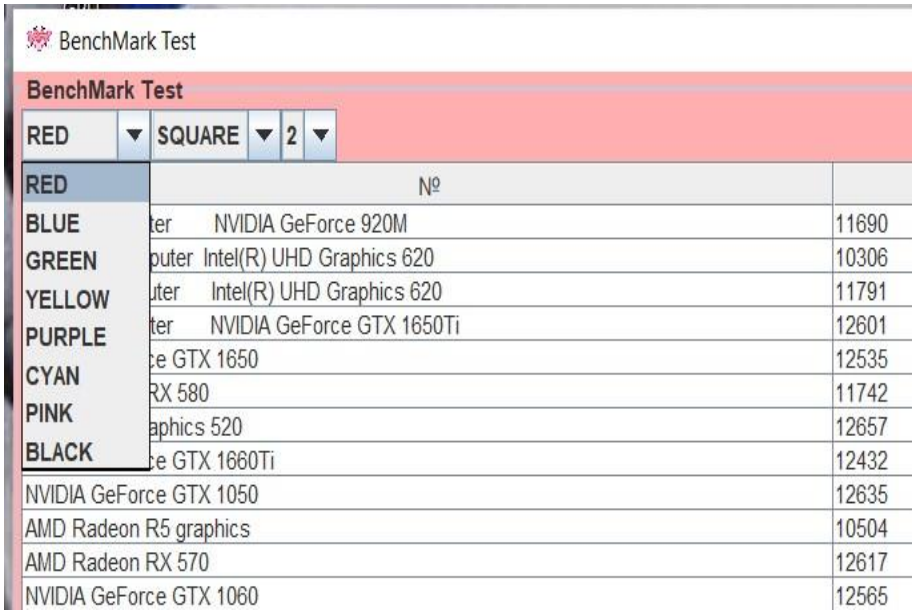
Usage

The user needs to double-click on the executable file after which a screen will pop up. Our GUI displays a table with our measurements plus another 9 more from different computers for all iteration and another row with the user's measurements which follows to be completed after executing the benchmark.

The user has the option of choosing the colour of the moving object , its shape and the

№	GRAPHIC TEST(ms)
Anca's computer NVIDIA GeForce 920M	11690
Daniela's computer Intel(R) UHD Graphics 620	10306
Sarah's computer Intel(R) UHD Graphics 620	11791
Silviu's computer NVIDIA GeForce GTX 1650Ti	12601
NVIDIA GeForce GTX 1650	12535
AMD Radeon RX 580	11742
Intel(R) HD Graphics 520	12657
NVIDIA GeForce GTX 1660Ti	12432
NVIDIA GeForce GTX 1050	12635
AMD Radeon R5 graphics	10504
AMD Radeon RX 570	12617
NVIDIA GeForce GTX 1060	12565
Intel(R) HD Graphics Family	12073
Tested computer	11739

number of iterations .



To start the measurement, a simple click of the "Start Test" button is needed.

When the process is finished, the tab needs to be closed and the final measurement will be displayed in the "tested computer"row, right at the end of the table. The results of our benchmark is a number expressed in milliseconds.

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Results

Here are our results :

Anca's computer NVIDIA GeForce 920M	11690
Daniela's computer Intel(R) UHD Graphics 620	10306
Sarah's computer Intel(R) UHD Graphics 620	11791
Silviu's computer NVIDIA GeForce GTX 1650Ti	12601
NVIDIA GeForce GTX 1650	12535
AMD Radeon RX 580	11742
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Intel(R) HD Graphics Family	12073

Our results are measurements that conclude tests from 13 different computers for each iteration available .You can see listed in the table the GPU's from the tested computers.