Physics simulator

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The application is a physics simulator. The particles react to the angle of the MPU6050. MPU6050 tilted left, particles will move left.

Libraries made for this project:

- MAX7219
- MPU6050
- Physics simulation

MPU6050 library:

Gives the user a simple interface:

- Get data straight from the registers.
- Get the angle based on the accelerometer data.
- Calibrate the MPU6050 to get more precise results.

```
return (atan(-1 * x / sqrt((y * y) + (z * z))) * 180 / pi) - errors.acc_y;
```

Physics simulation:

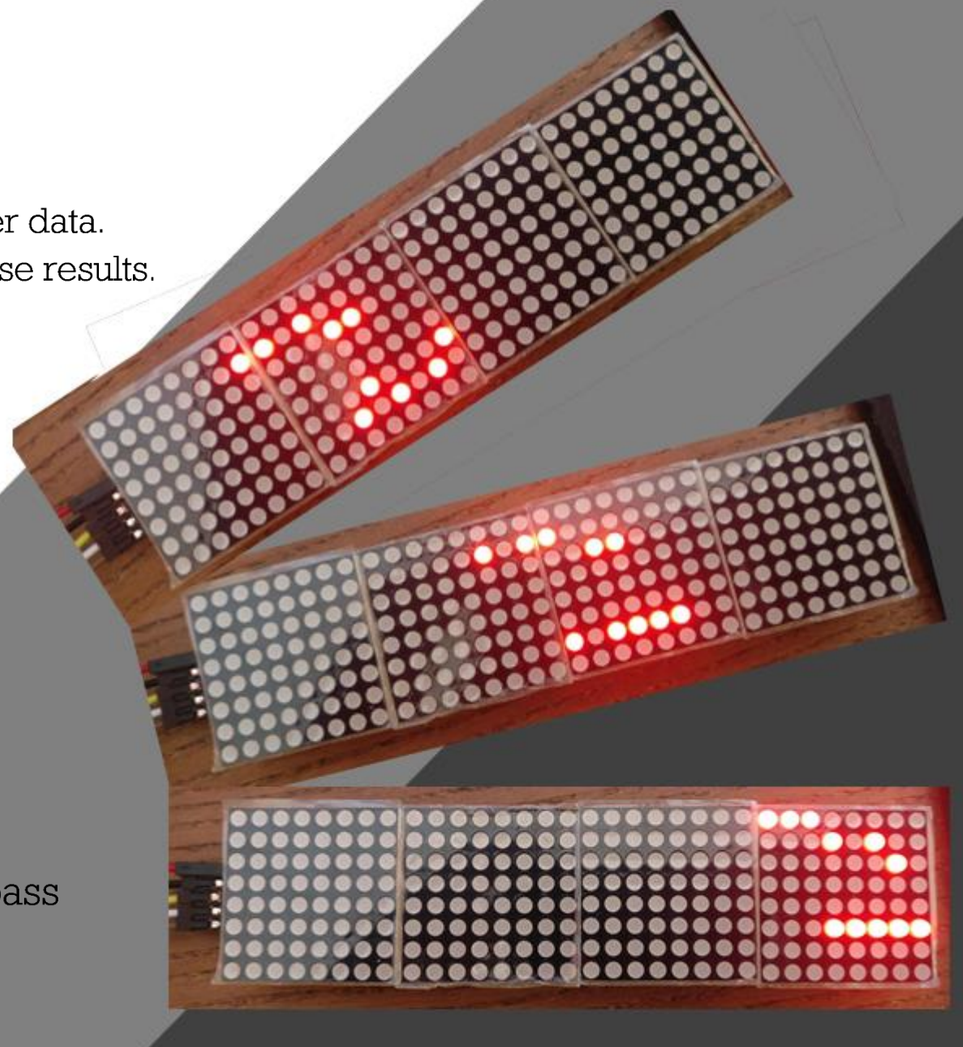
- All particles move seperately.
- Collision detection.
- Variable speed and acceleration.
- Precise positioning.
- Resistance on all particles.

```
void updateParticles() {
  uint64_t current_time = now_us();
  double d_time = (current_time - previous_time) / 1e6;
  previous_time = current_time;
  for (unsigned int i = 0; i < N; i++) {
    particles[i]->updateSpeed(acceleration, d_time, resis_const);
  }
  for (unsigned int i = 0; i < N; i++) {
    particles[i]->updatePosition(d_time, particles, i);
  }
}
```

MAX7219 library:

Implements the 8x8 led matrix as a hwlib window.

Uses the clear, write and flush funtionalities.



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Disclaimer: Application and libraries need hwlib and bmptk to work

https://github.com/StijnvanWijk98/Ipass