Laporan Tugas Besar 1 IF3260 Grafika Komputer
WebGL Part 1: 2D Primitive Elements

Dibuat oleh:

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SEKOLAH TEKNIK ELEKTRO DAN INFORMATIKA

INSTITUT TEKNOLOGI BANDUNG

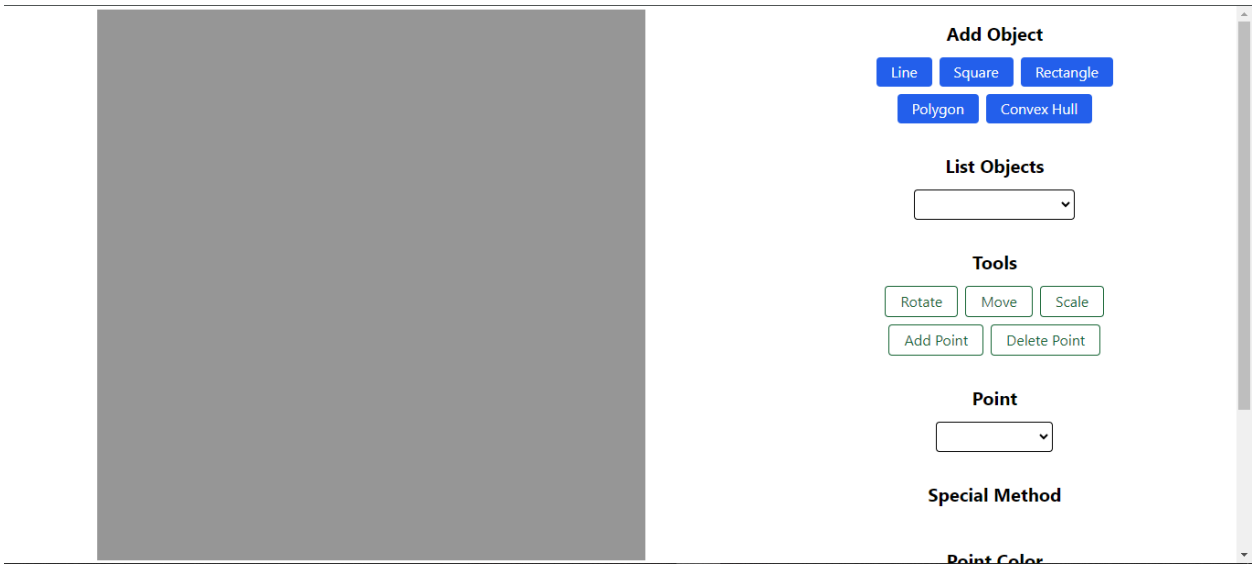
TAHUN AJARAN 2023/2024

A. Deskripsi

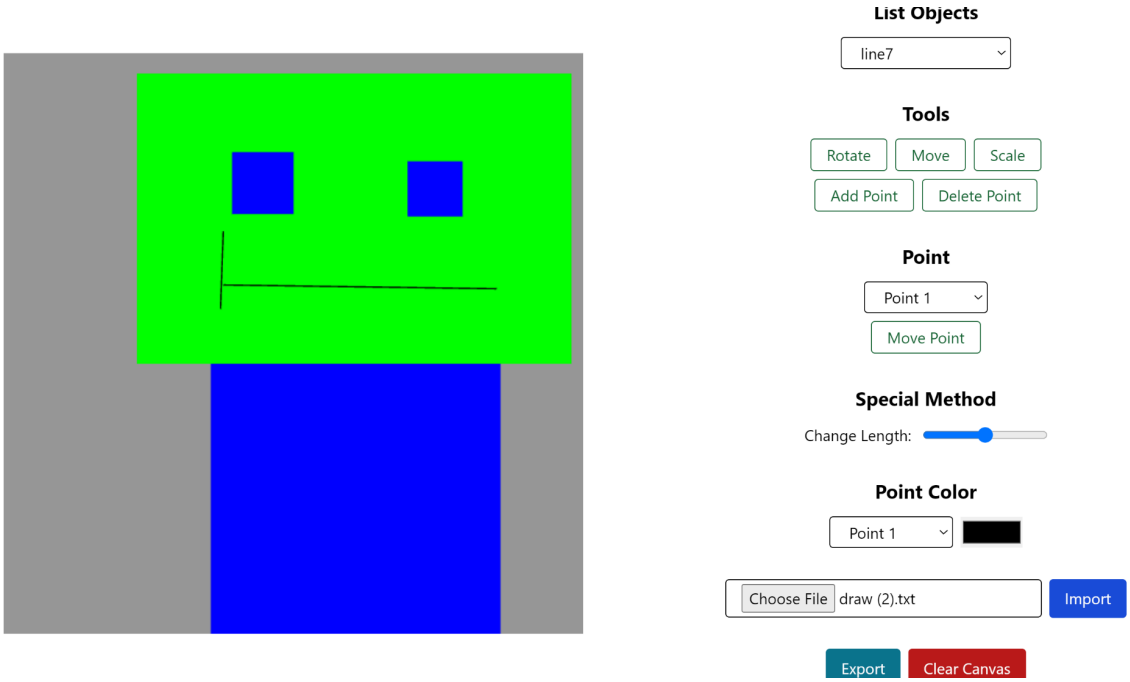
Dalam tugas besar 1 Grafika Komputer, kami mengembangkan sebuah program CAD berbasis web 2D (*Computer-Aided Design*). Tujuan dari tugas ini adalah untuk memungkinkan mahasiswa menggunakan WebGL secara penuh untuk membuat dan mengimplementasikan web dengan kemampuan menggambar, mengedit, dan memvisualisasikan beberapa model di atas kanvas. Spesifikasi yang harus kami penuhi meliputi beberapa hal berikut:

1. Membuat dan menjelaskan fungsi-fungsi WebGL yang kami implementasikan sendiri dalam file README.
2. Model-model yang harus kami implementasikan adalah sebagai berikut.
    a. Garis: Kemampuan untuk mengubah panjangnya.
    b. Persegi: Dapat mengubah panjang sisi-sisinya.
    c. Persegi Panjang: Mampu mengubah panjang atau lebar sisi-sisinya.
    d. Poligon: Memungkinkan penambahan dan penghapusan titik-titik sudut.
3. Setiap model minimal harus memiliki kemampuan sebagai berikut.
    a. Minimal dua transformasi geometri dari translasi, dilatasi, rotasi, dan shear.
    b. Kemampuan untuk memindahkan salah satu titik sudut.
    c. Dapat mengubah warna salah satu atau semua titik sudut.
    d. Kemampuan untuk menyimpan sebuah model dan memuat kembali model tersebut.
4. Implementasi minimal satu fitur lanjutan seperti berikut.
    a. Implementasi algoritma untuk menggambar polygon sedemikian sehingga dengan urutan penambahan titik yang berubah pun, gambar akhir polygon tetap sama yang merupakan *convex hull* dari titik-titiknya
    b. Integrasi *animation* pada salah satu fitur yang ada
    c. Fitur penguncian pada salah satu aspek, misalnya sudut suatu titik dalam polygon dapat dilock sehingga saat di-*drag* atau dipindahkan, titik tersebut masih bersudut sama. Contoh lain penguncian keliling, luas, atau kesebangunan
    d. Menghasilkan model baru hasil irisan atau union dari 2 model

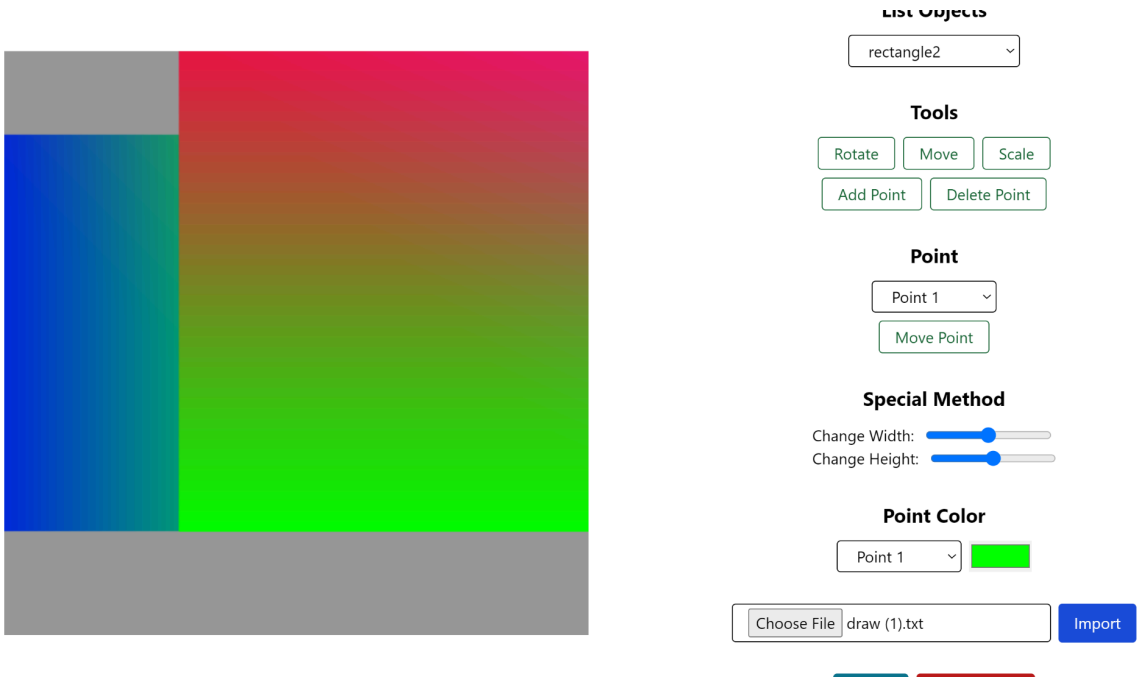
B. Hasil



Gambar 1. Tampilan program CAD berbasis web 2D



Gambar 2. Contoh gambar menggunakan program 1



Gambar 3. Contoh gambar menggunakan program 2

C. Fungsionalitas Program

Berikut adalah fungsionalitas yang telah diimplementasikan oleh kelompok kami pada setiap model.

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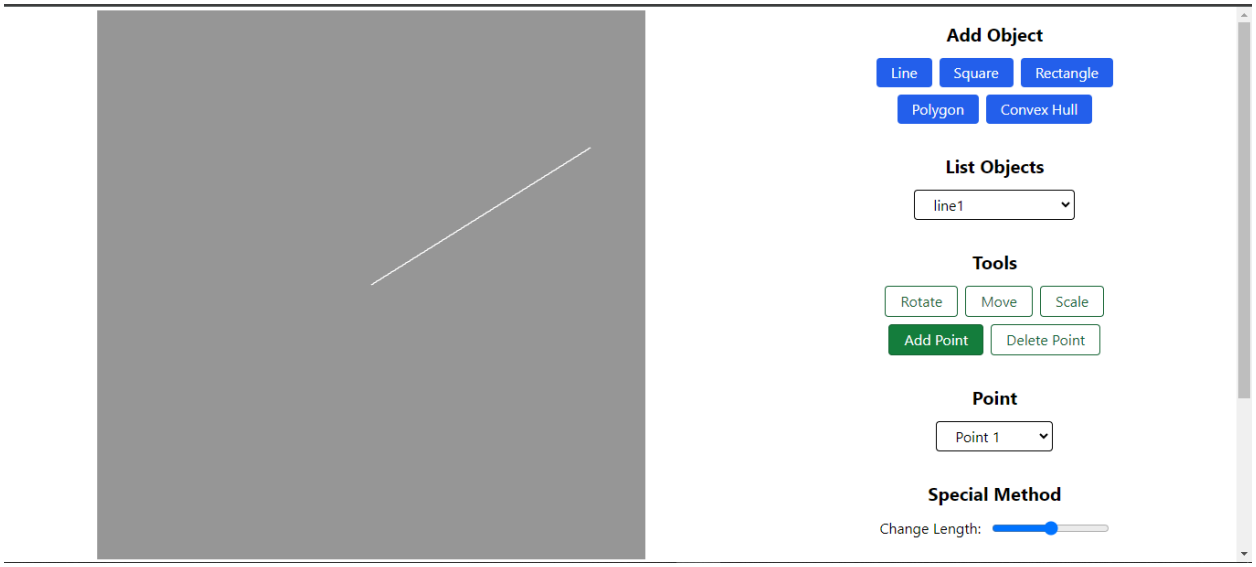

Penambahan garis

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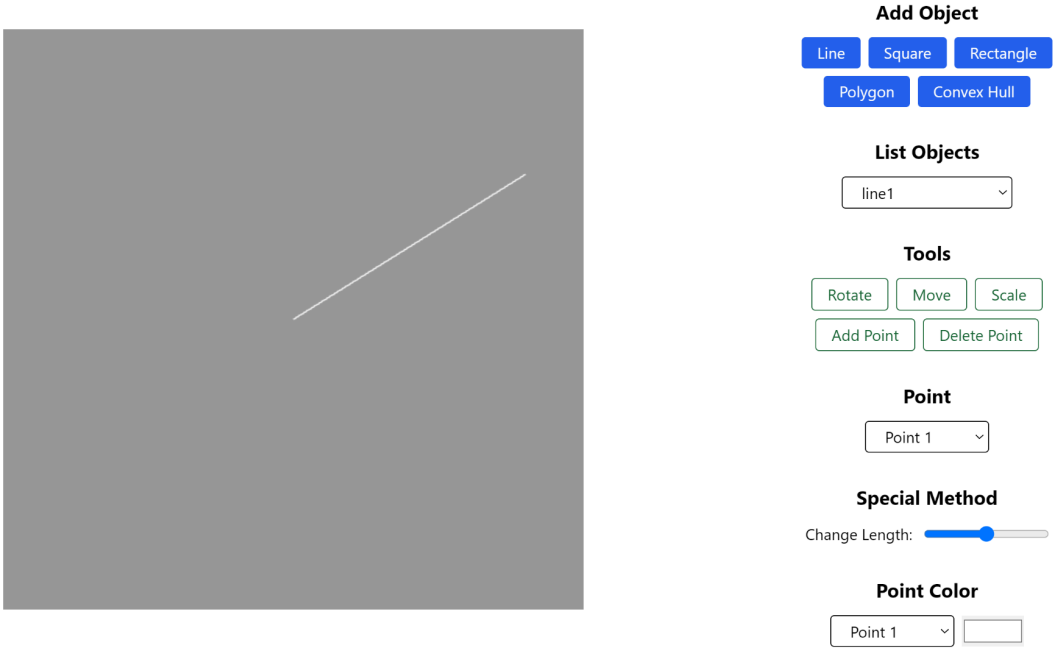
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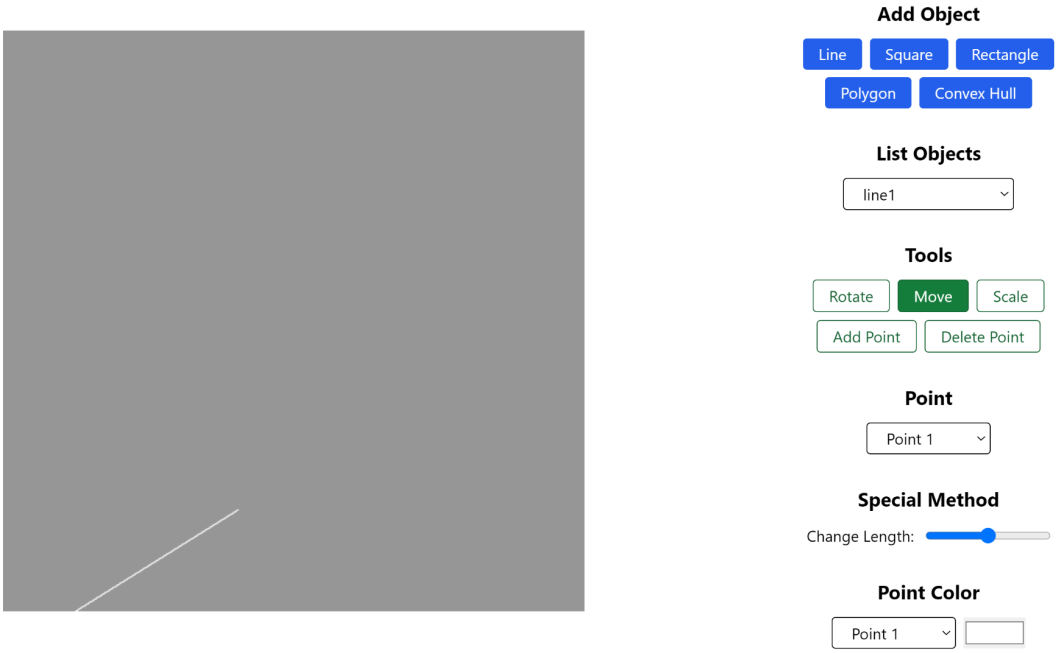
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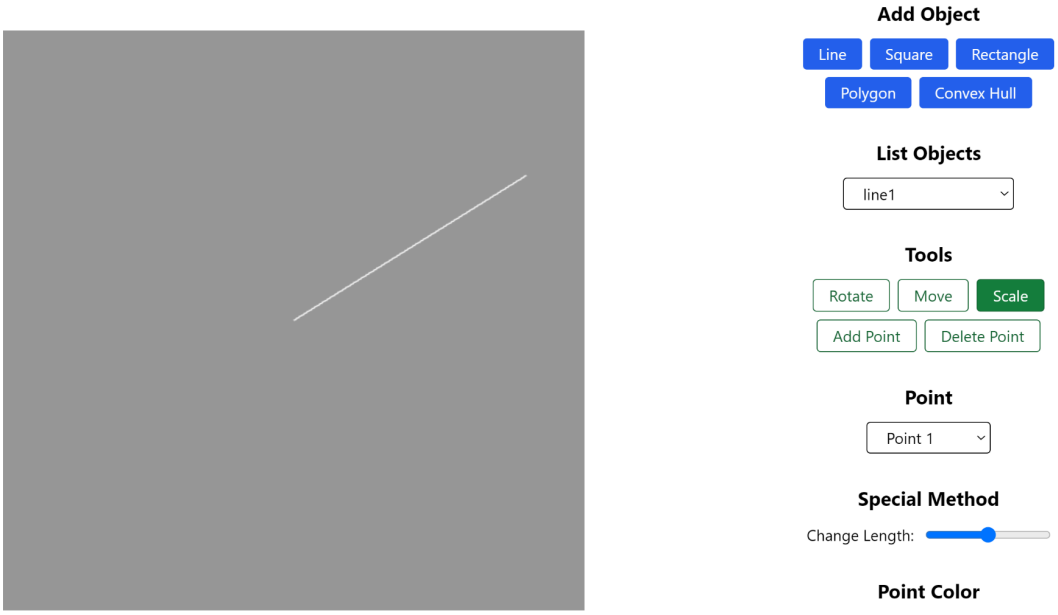
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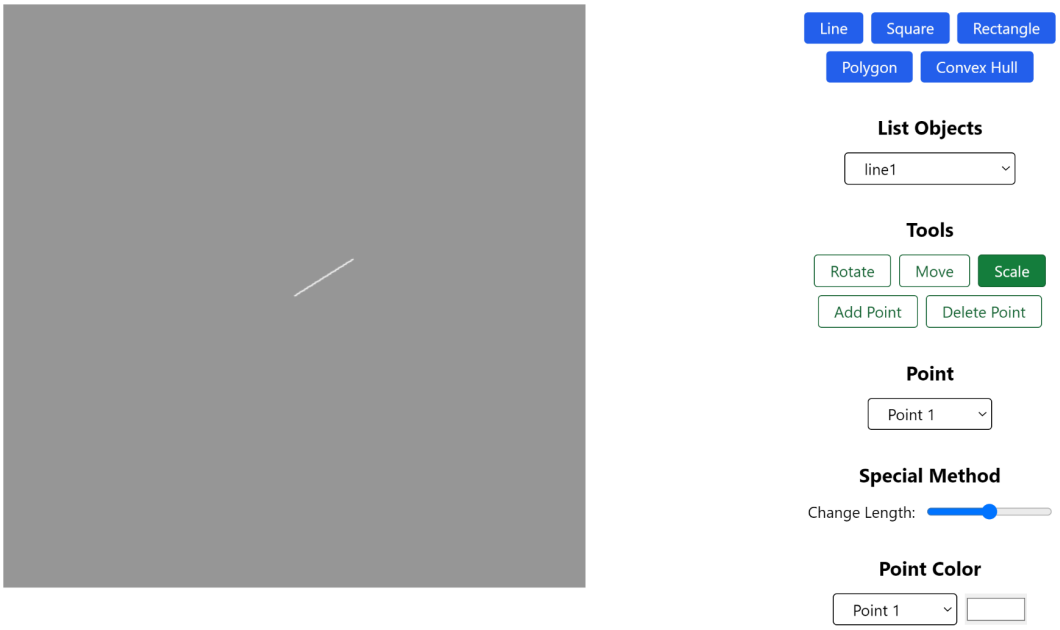
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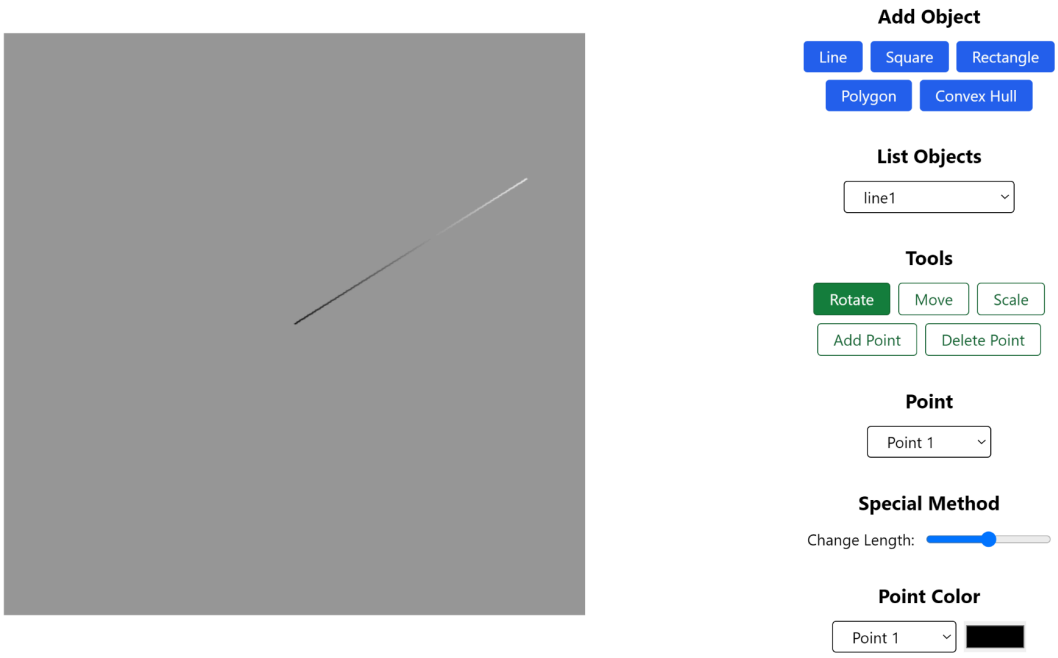
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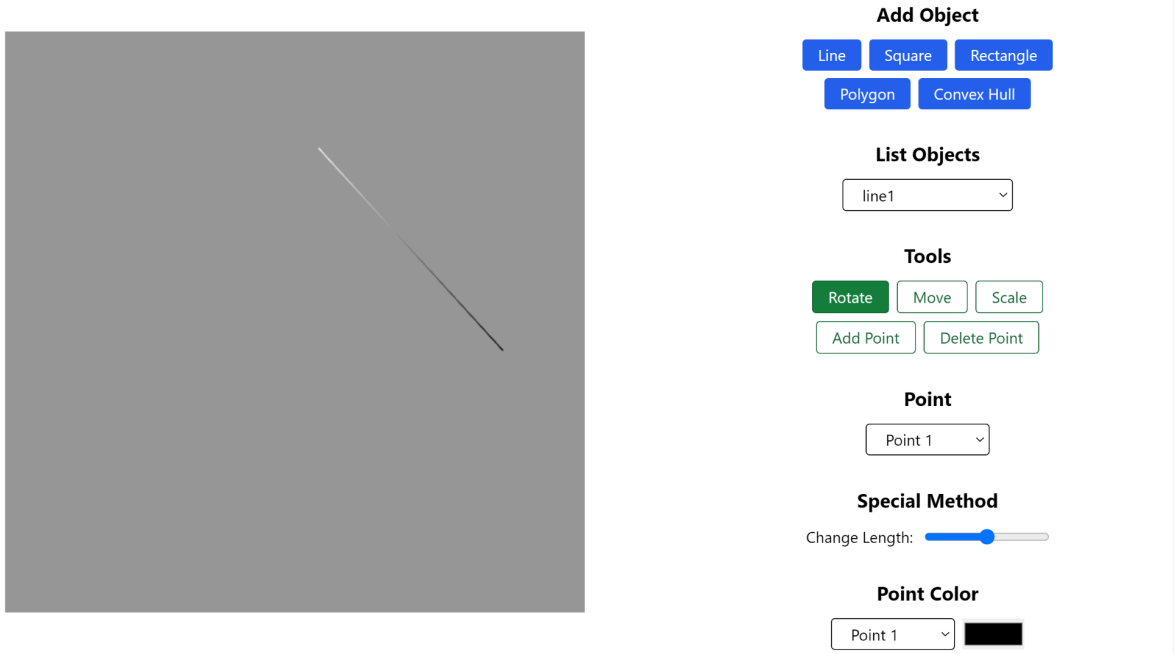
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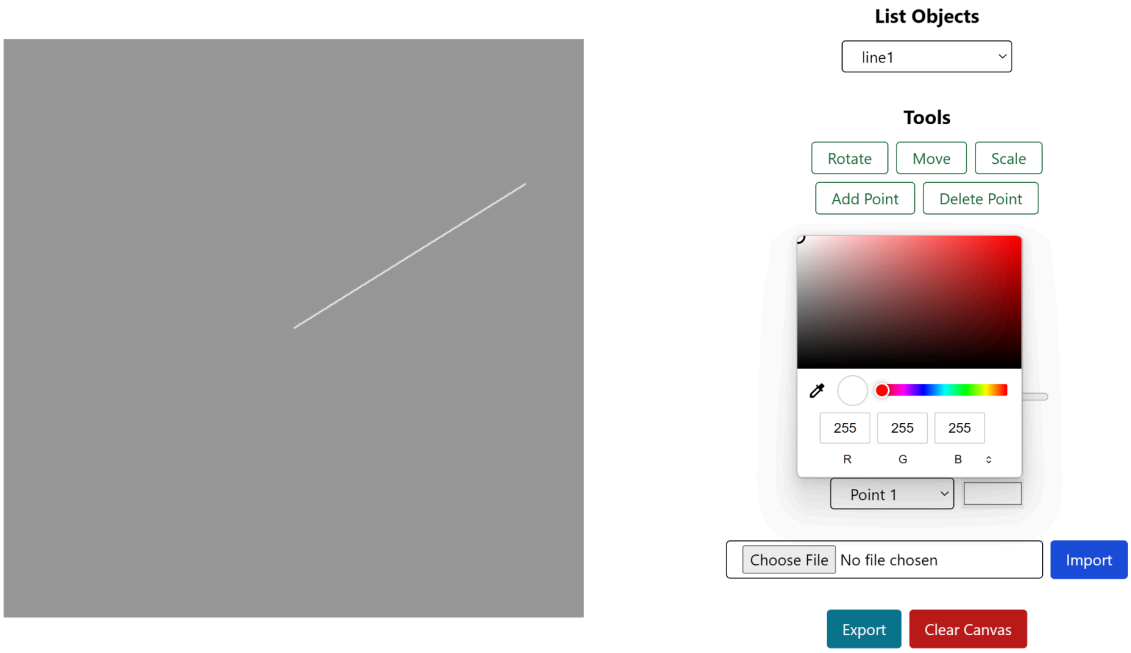
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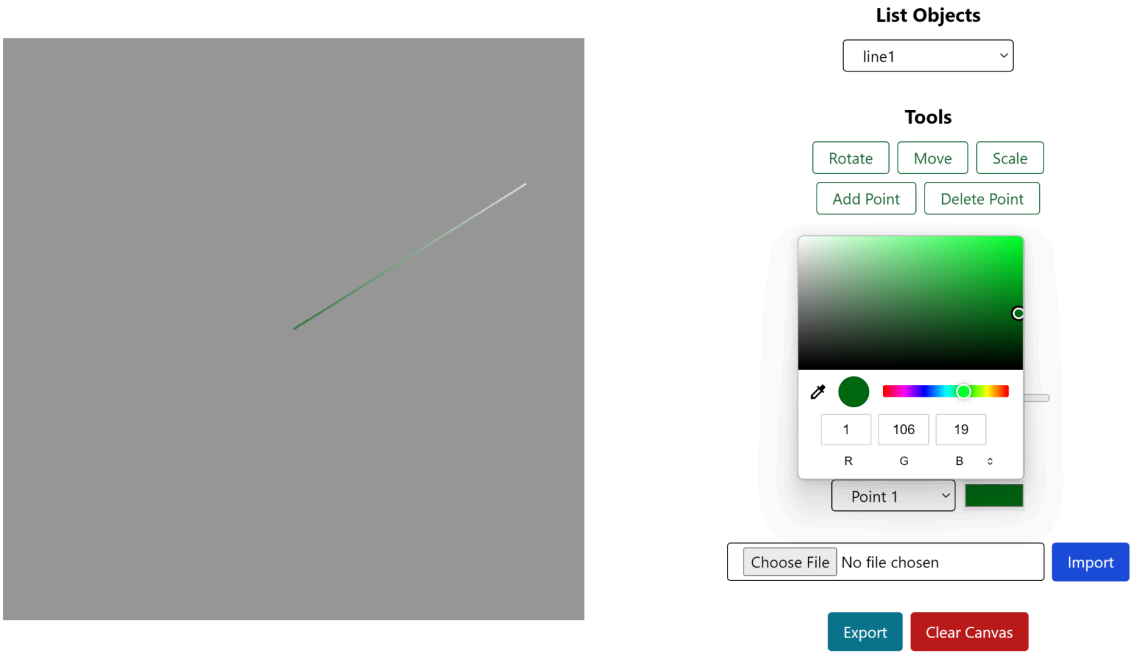
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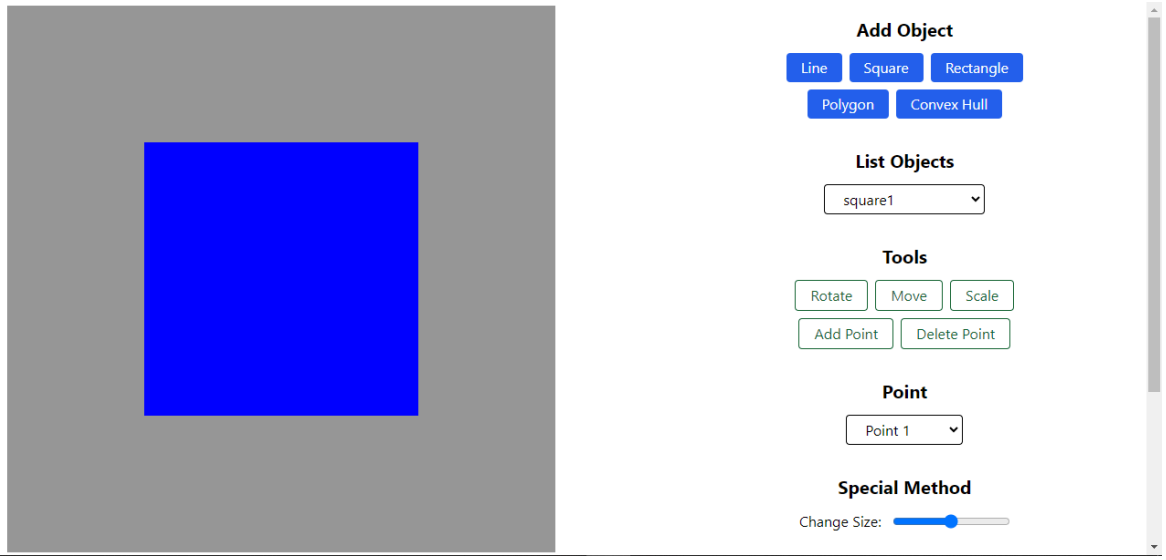

Penambahan Persegi

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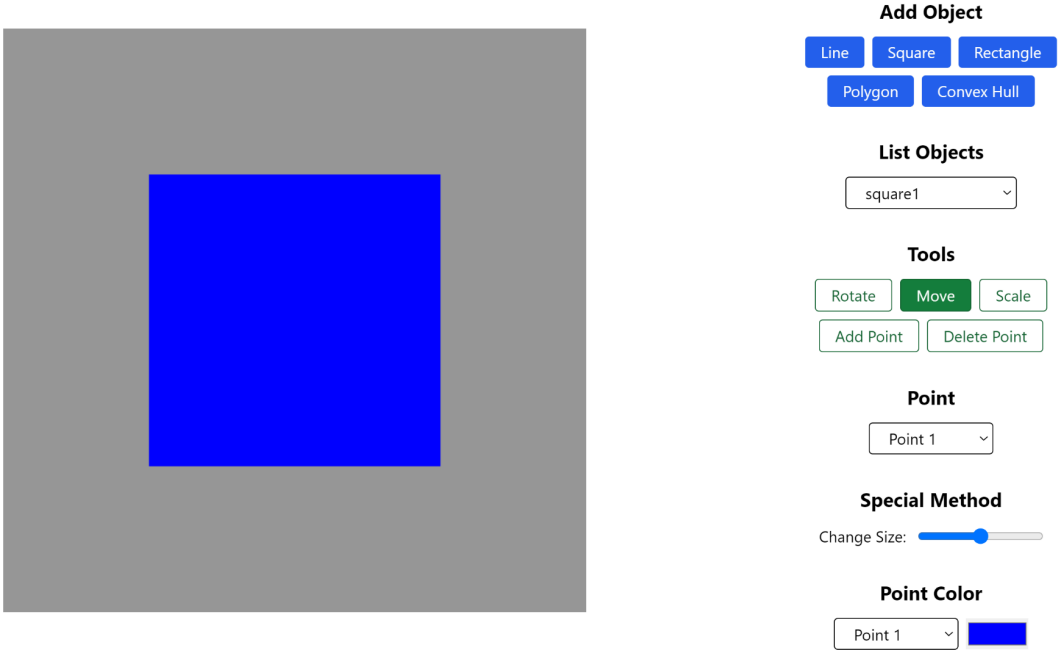

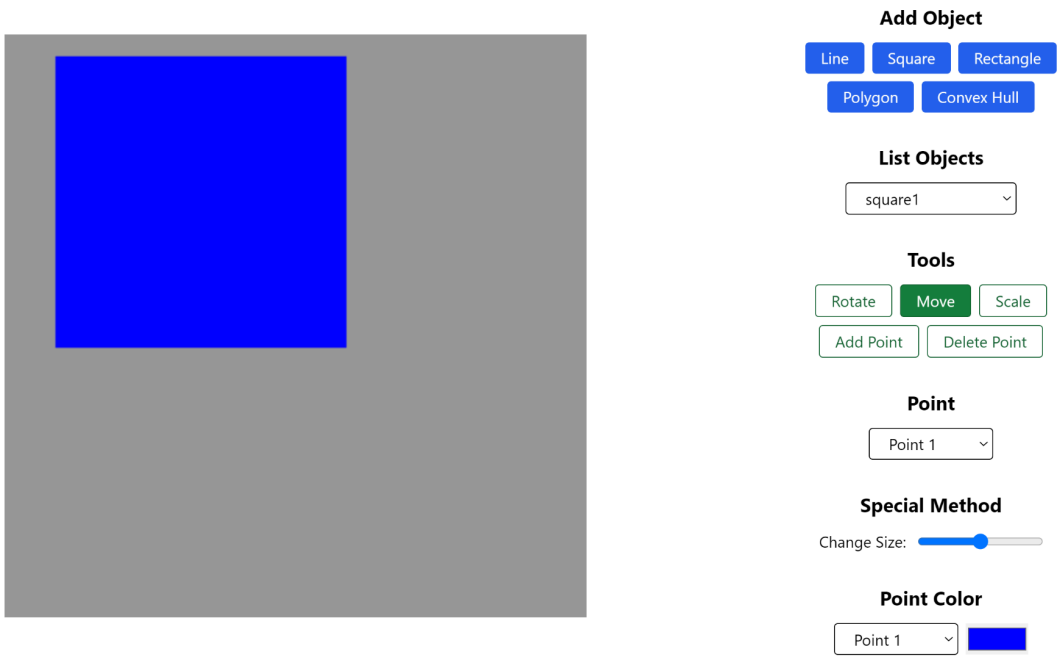
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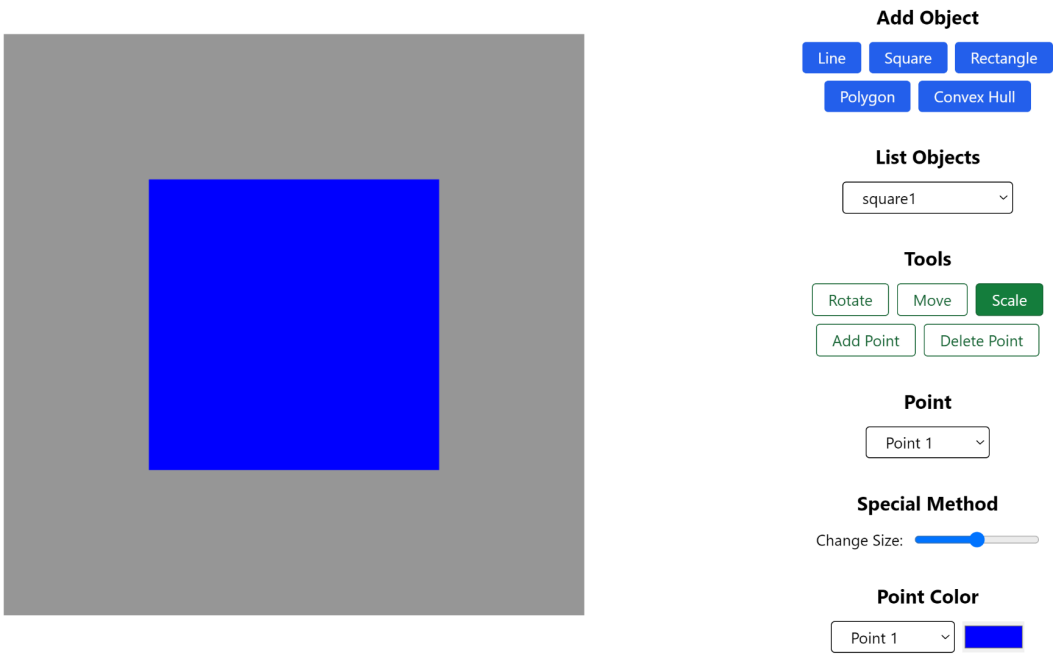
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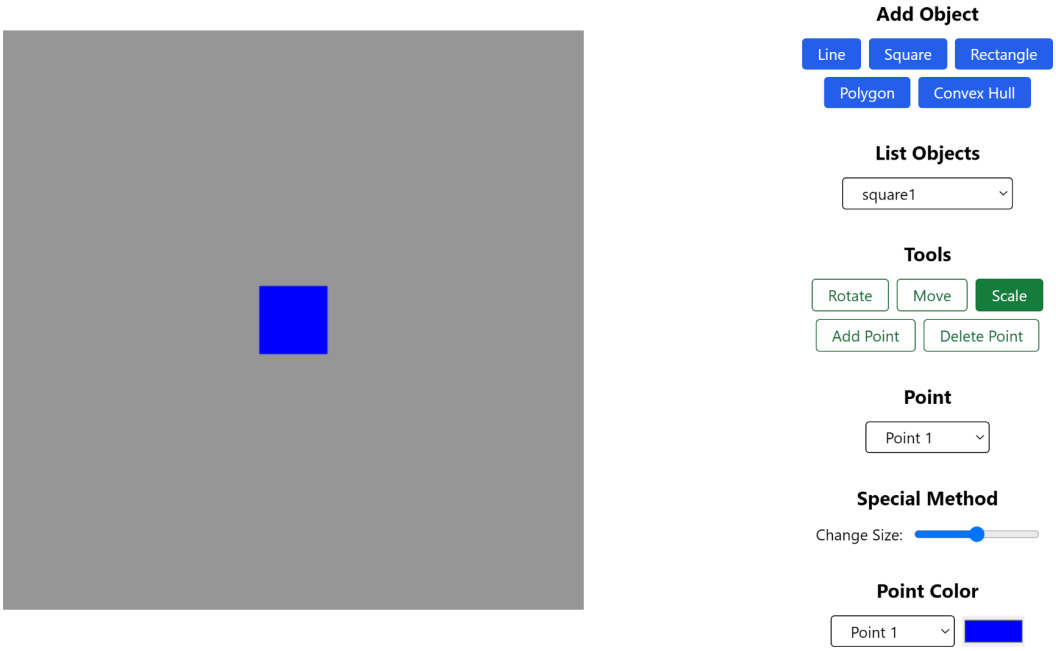
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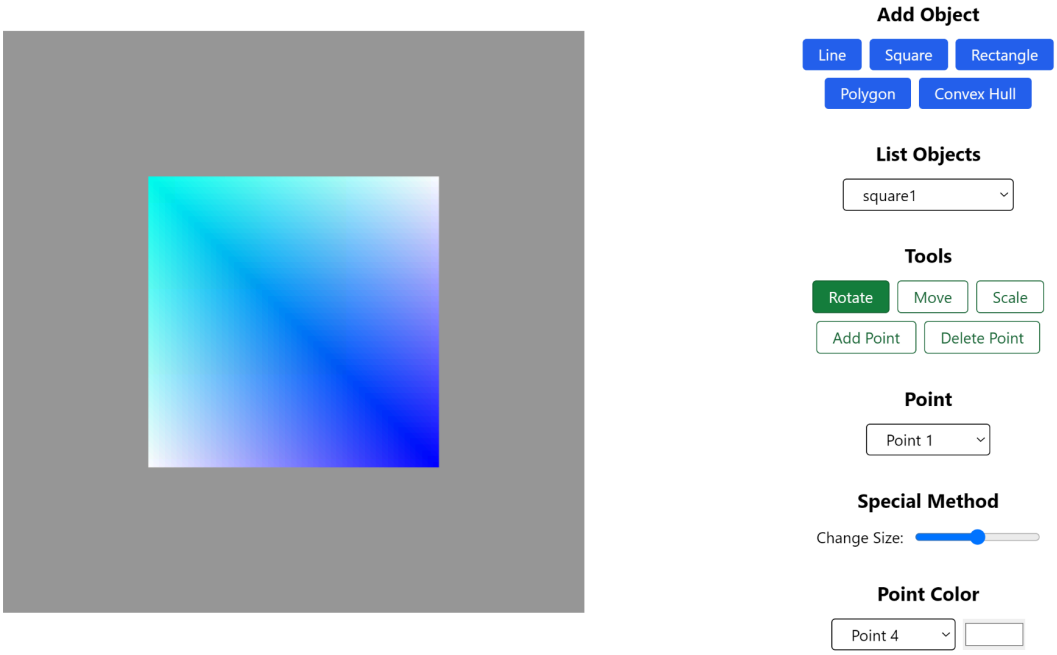
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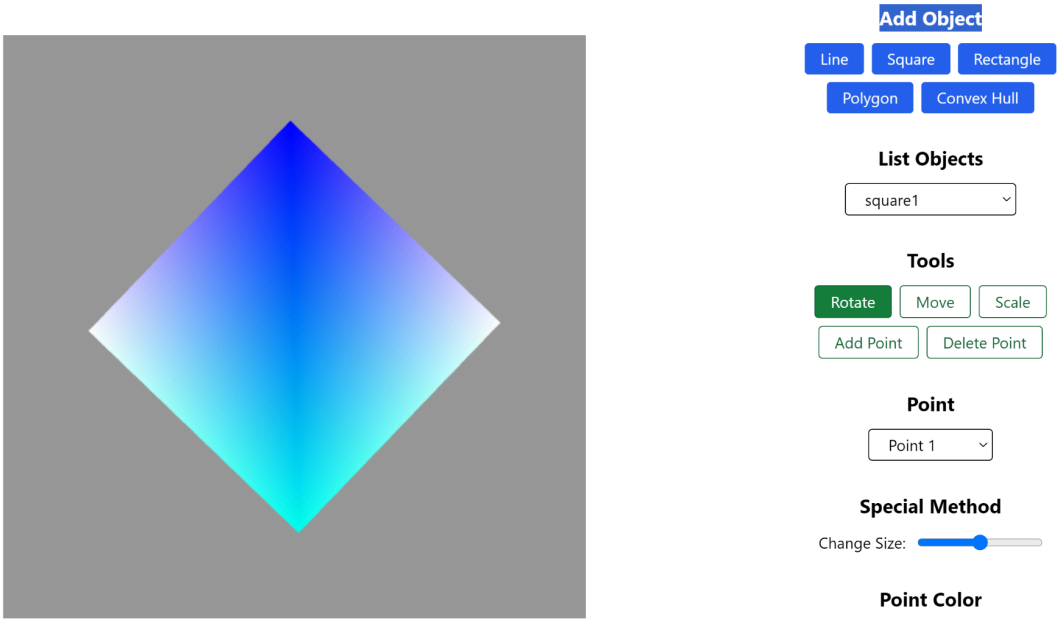
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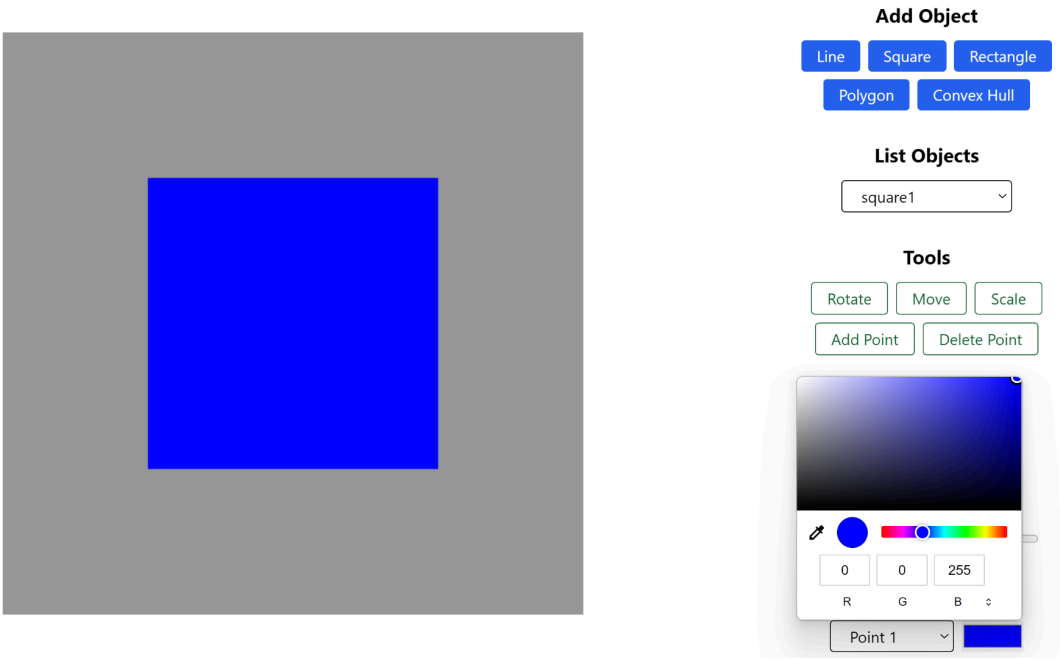
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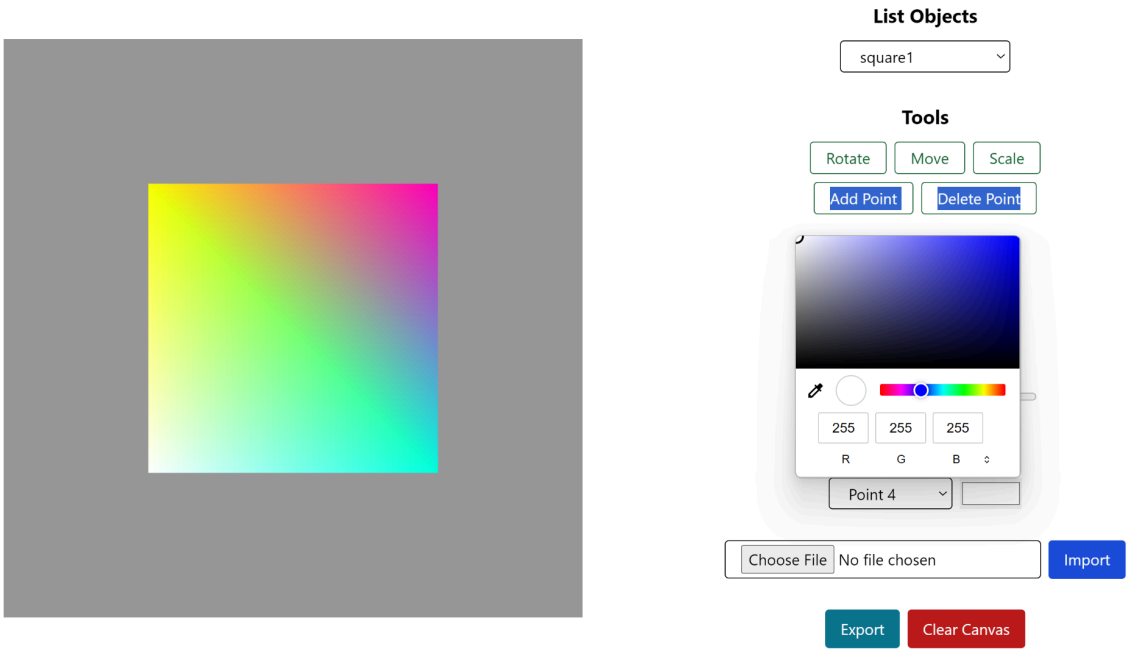

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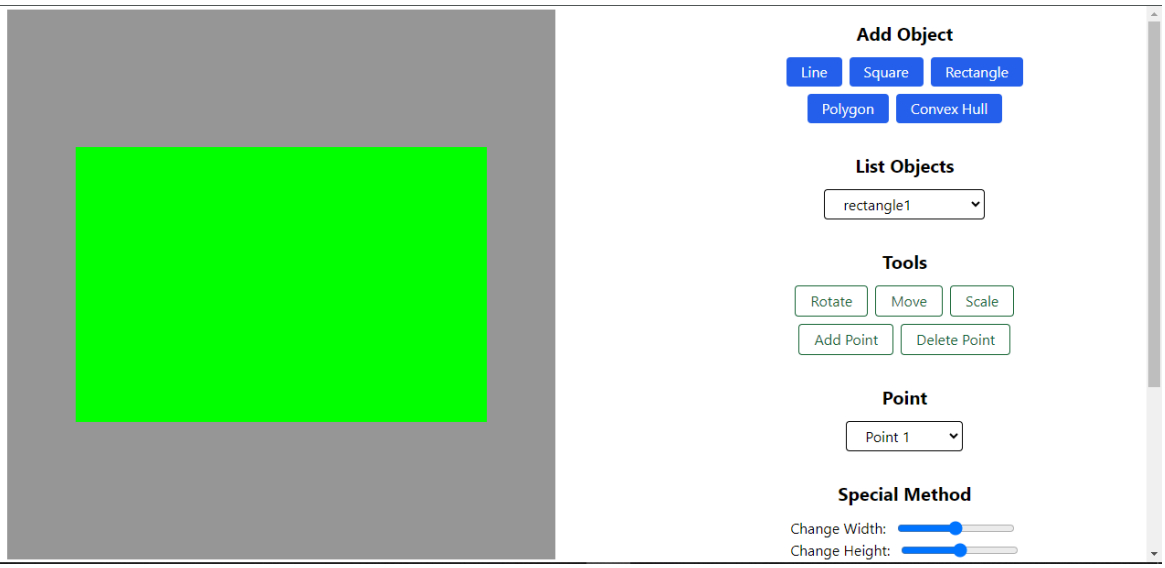

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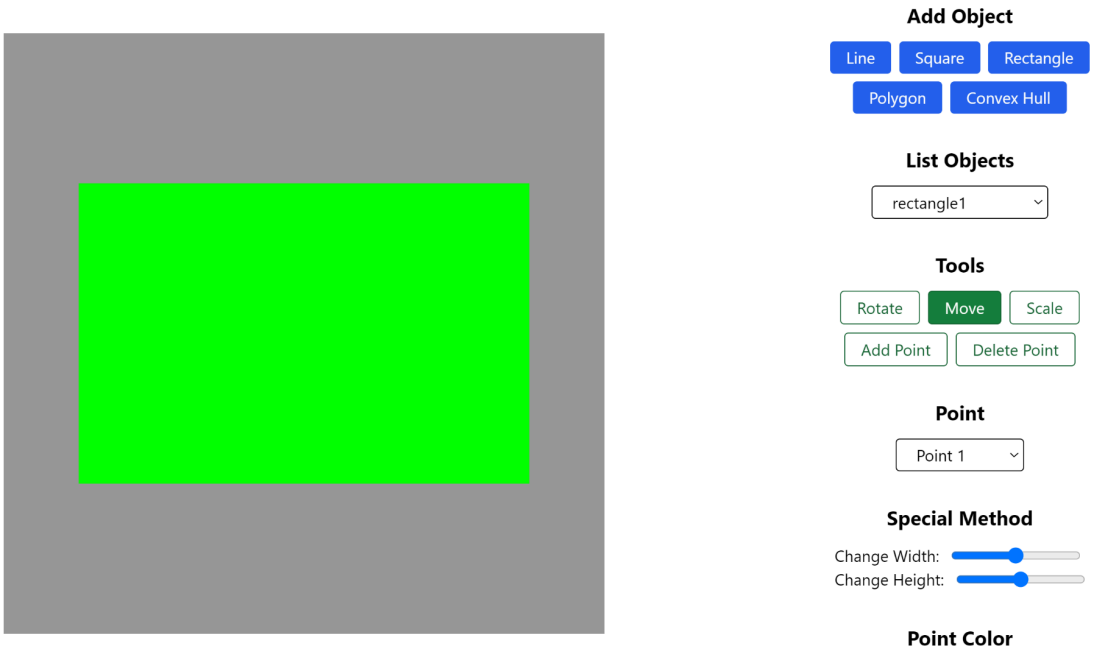
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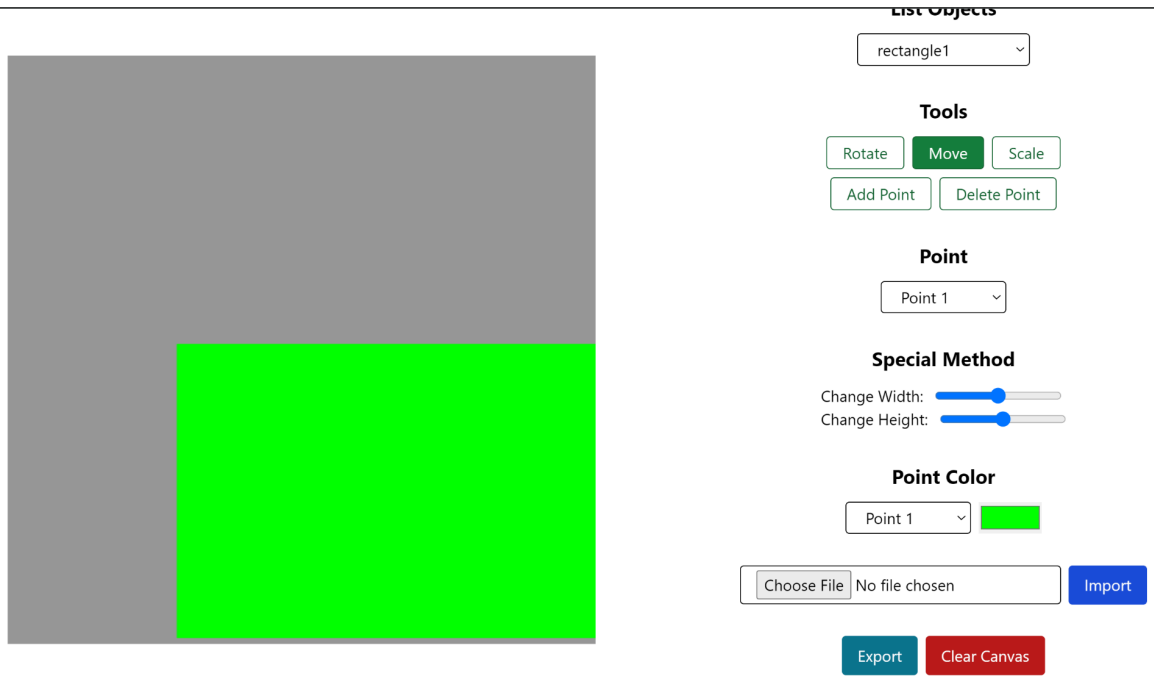
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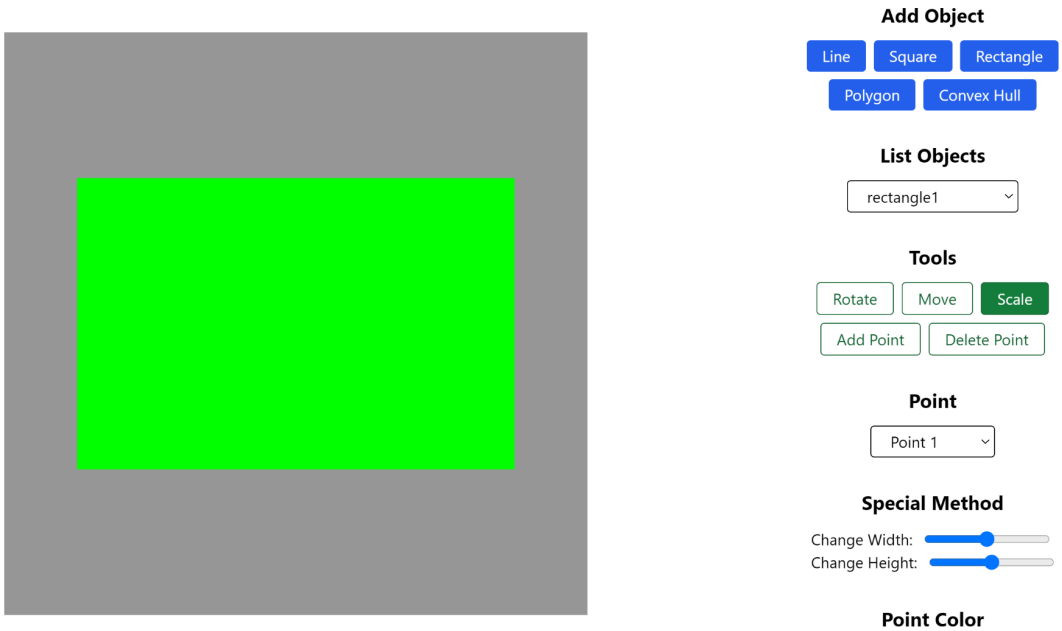
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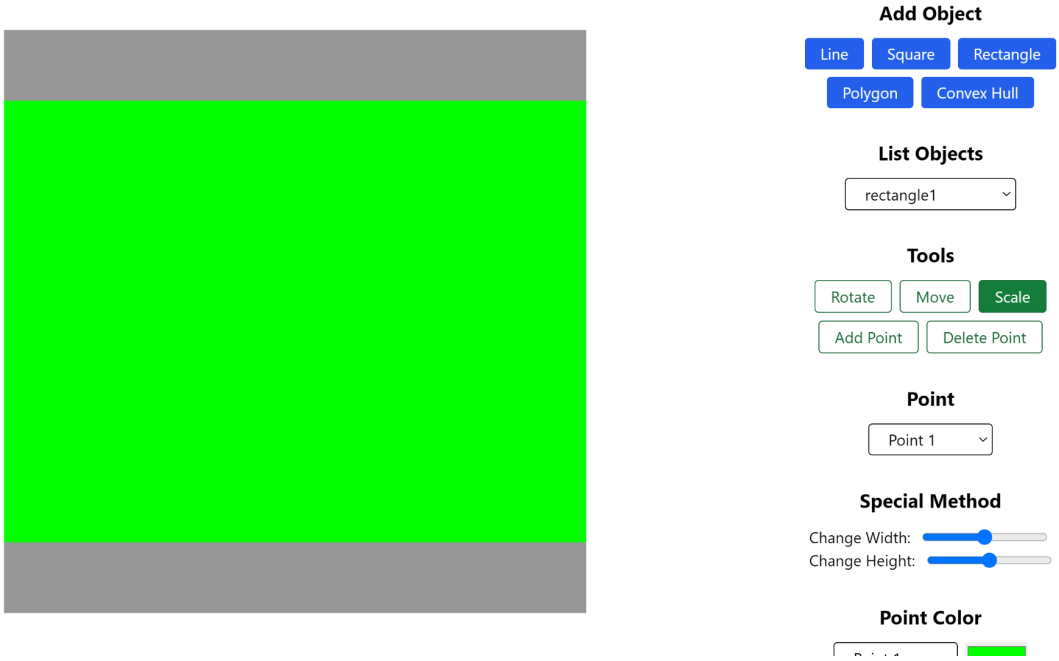
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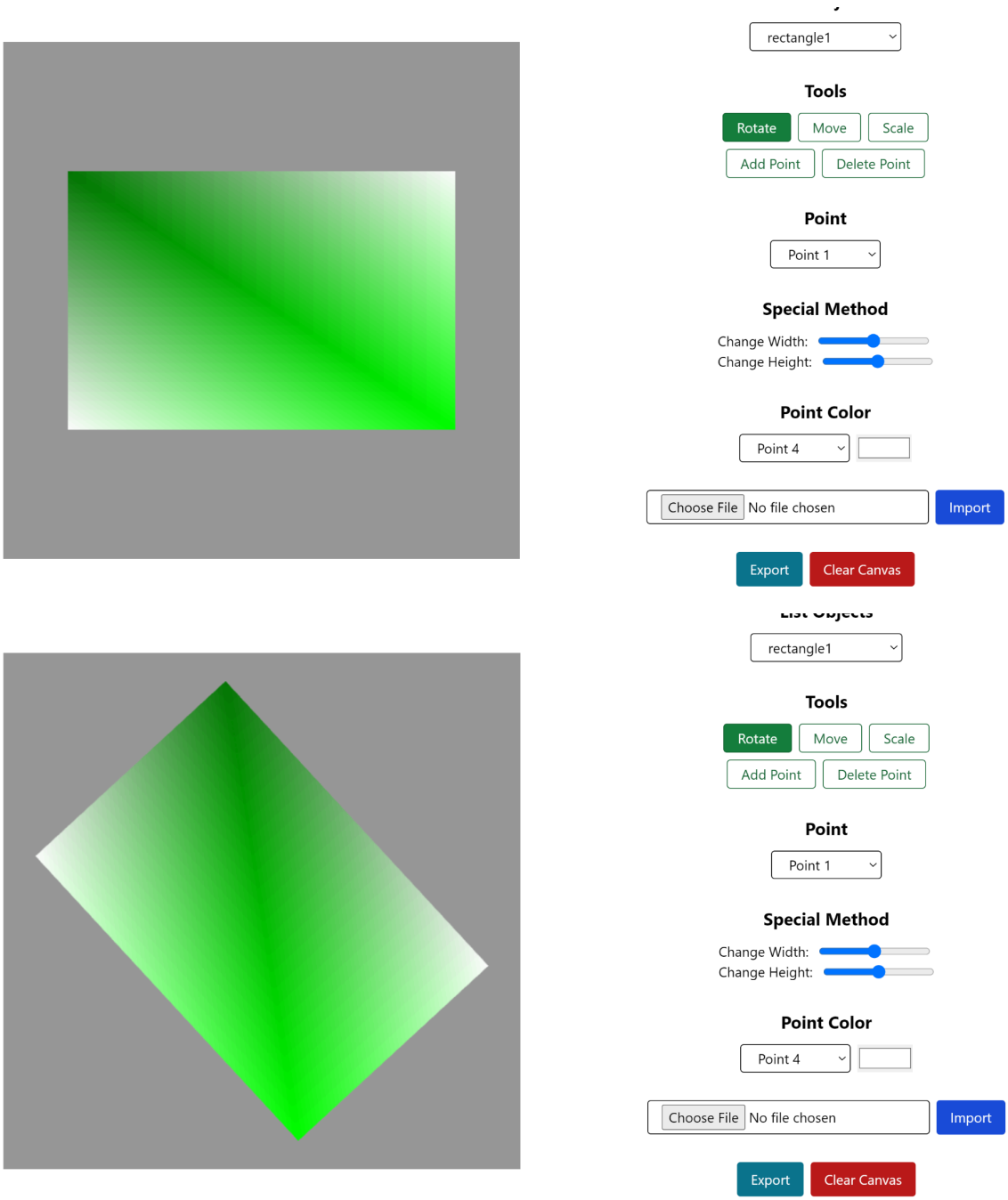
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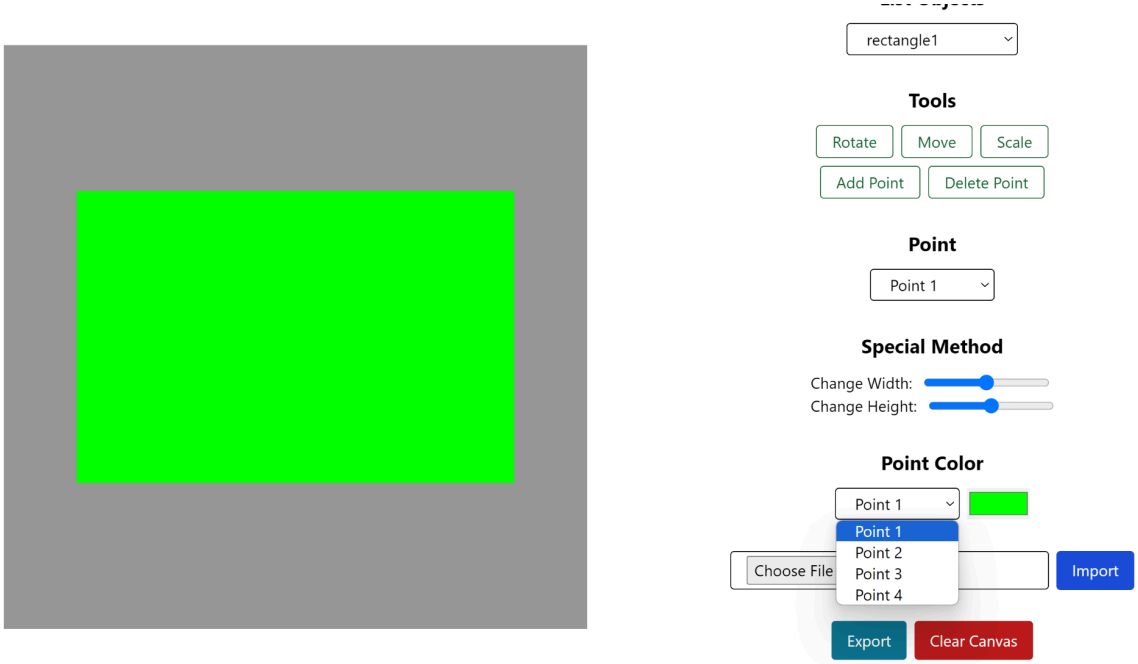
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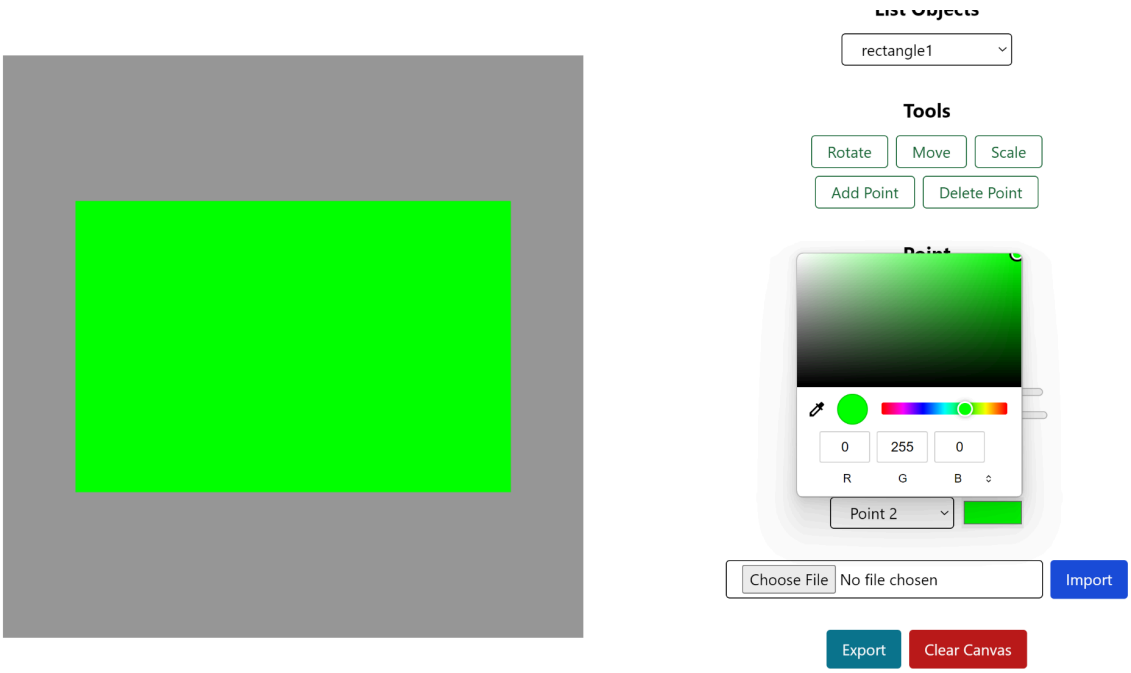
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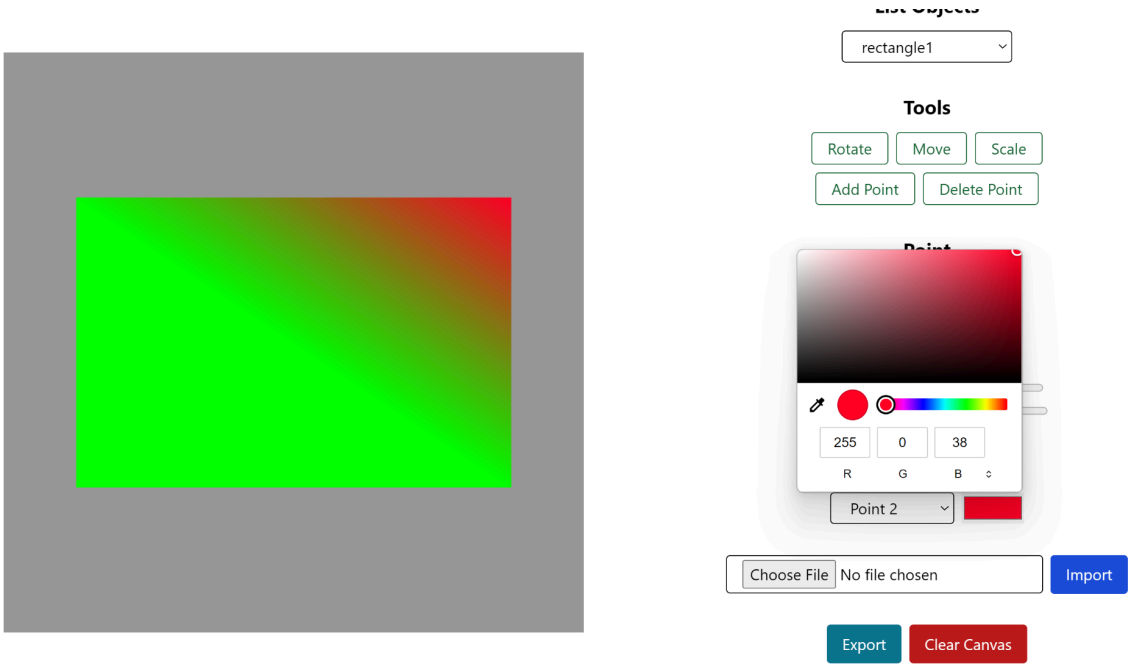

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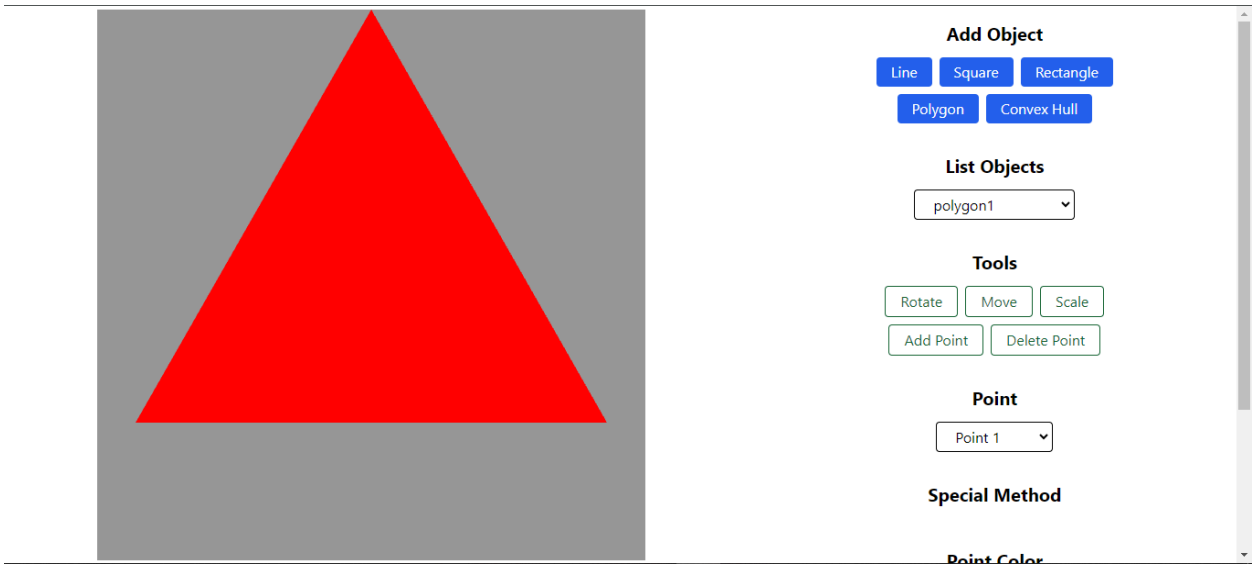

Penambahan Polygon

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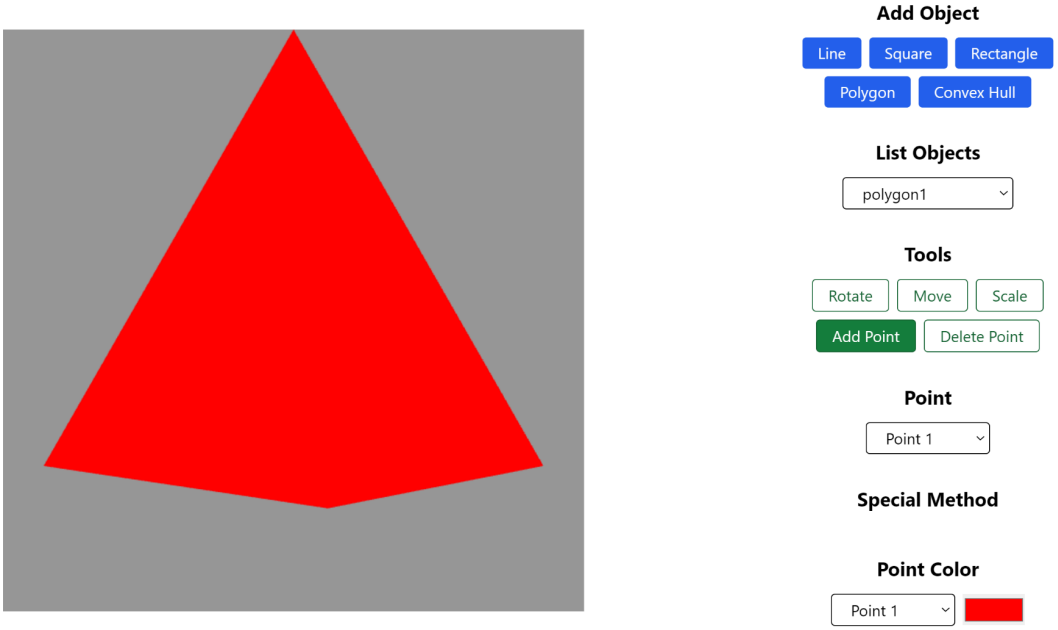
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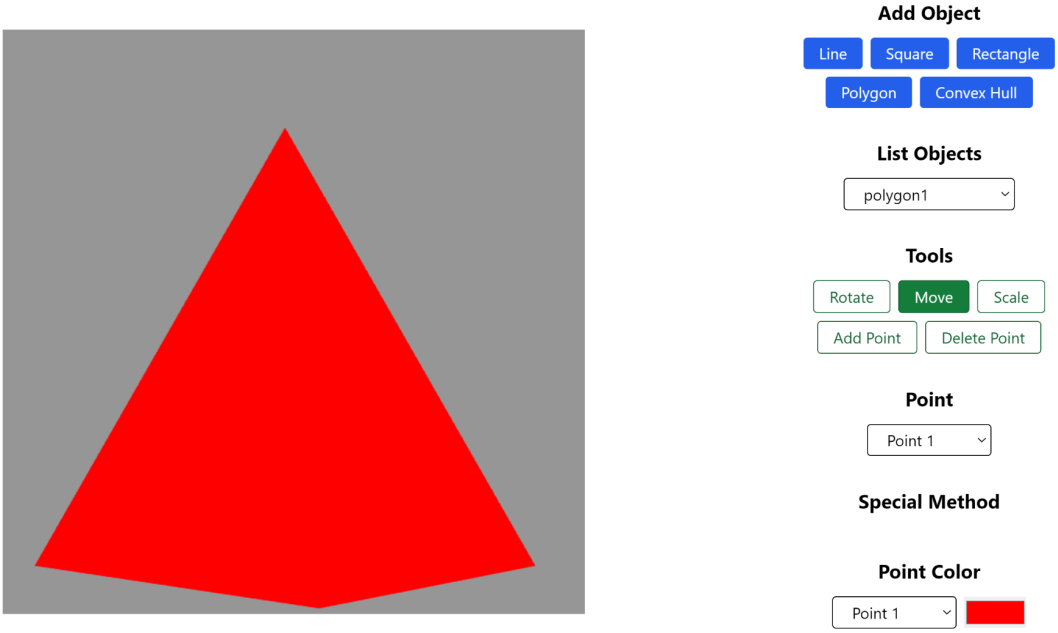
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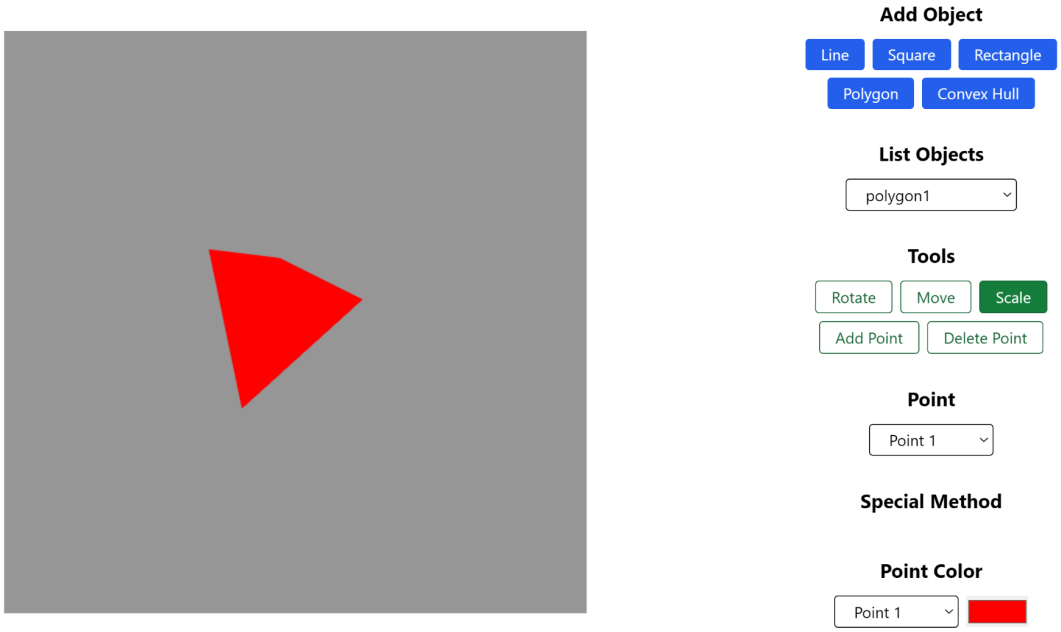
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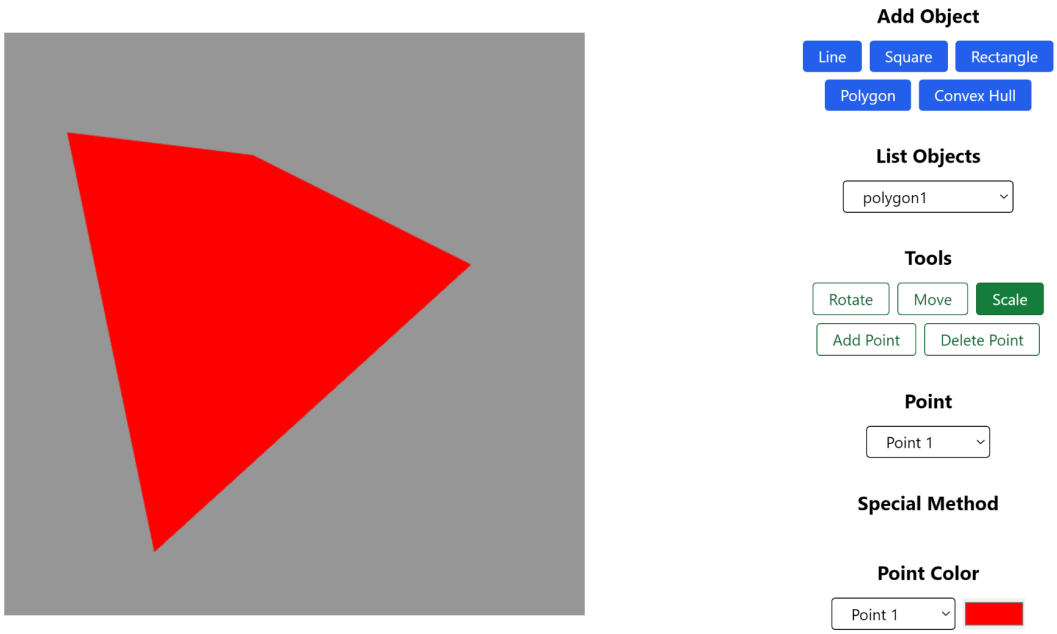
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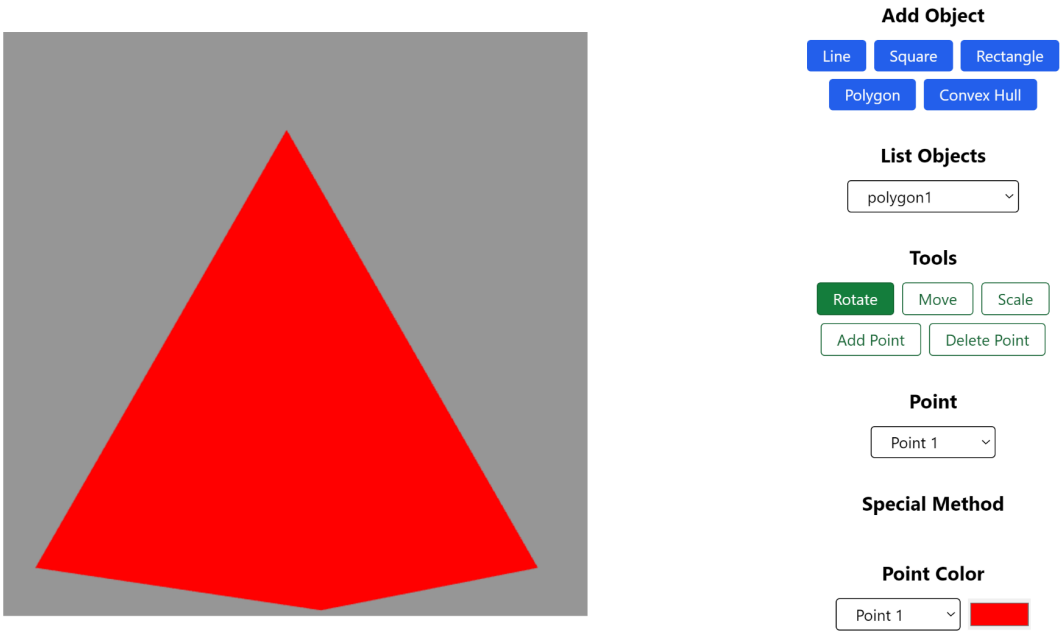
c. Rotasi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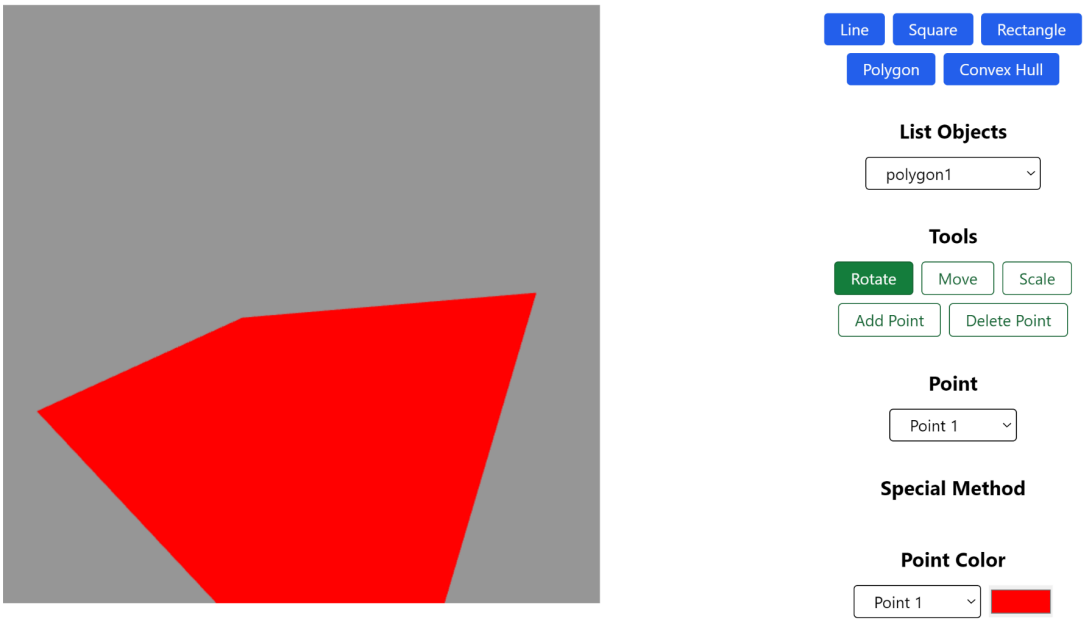
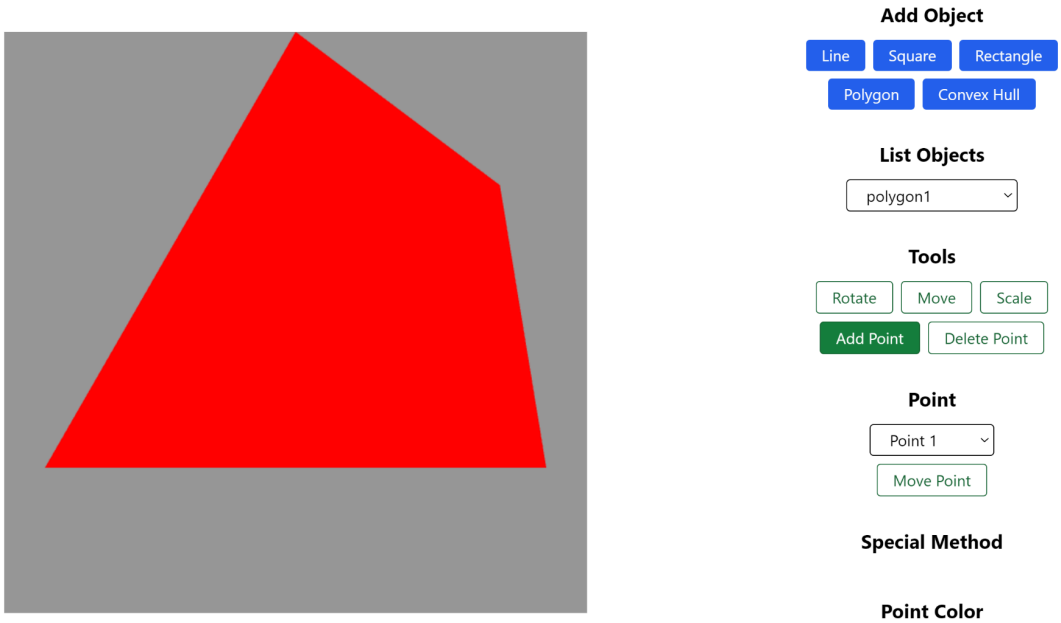
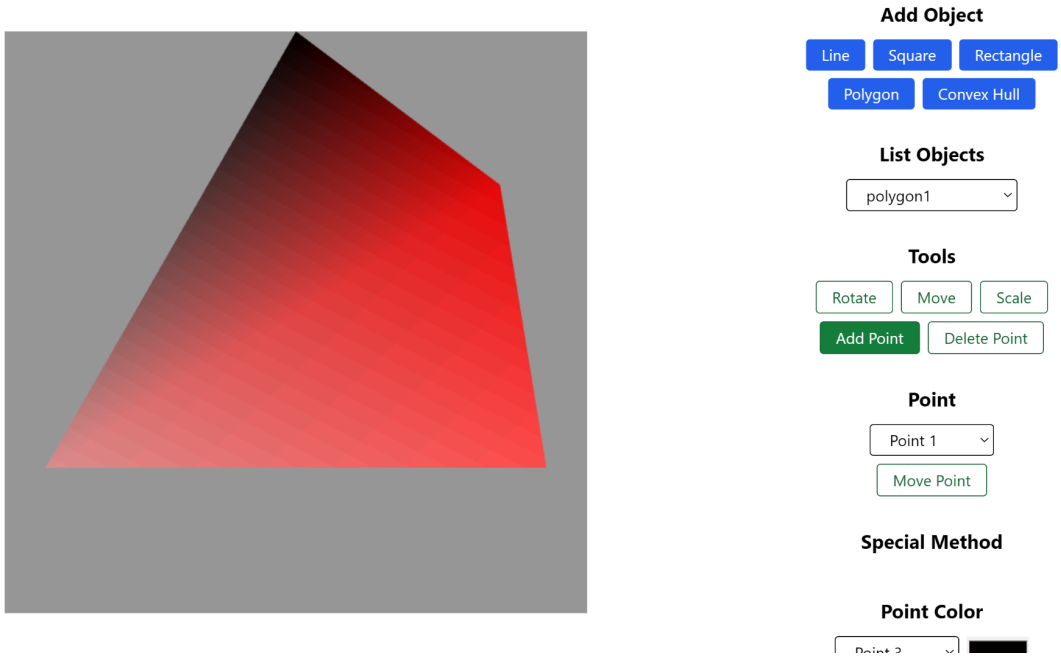
Point Color
Point 1

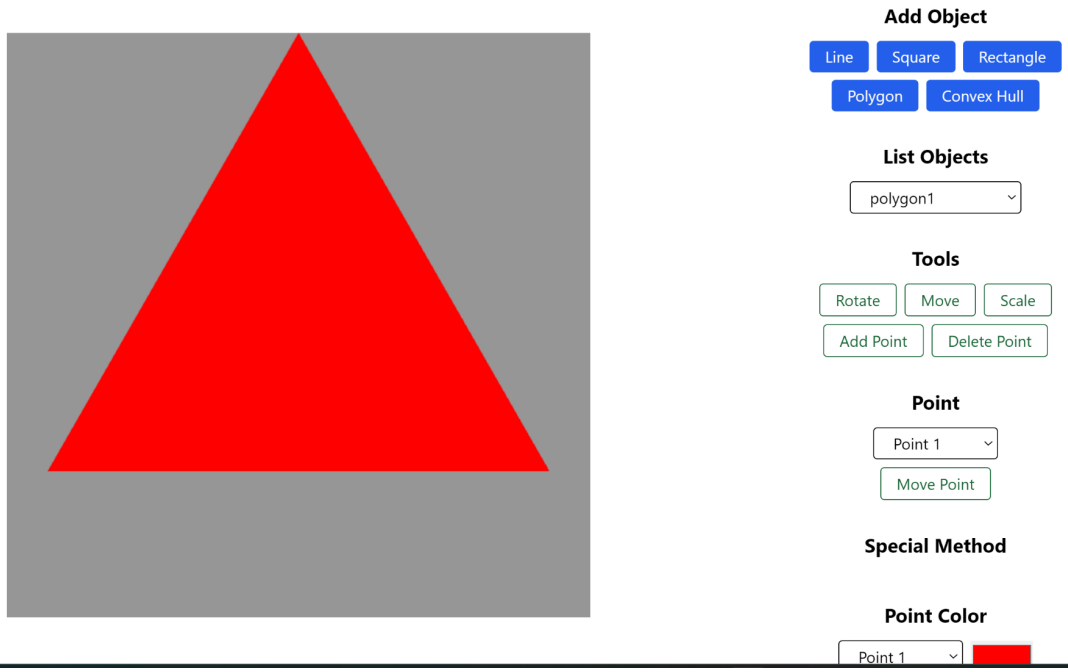

Add Object
Line
Square
Rectangle
Polygon
Convex Hull
List Objects
polygon1
Tools
Rotate
Move
Scale
Add Point
Delete Point
Point
Point 1
Special Method
Point Color
Point 1

d. Colour

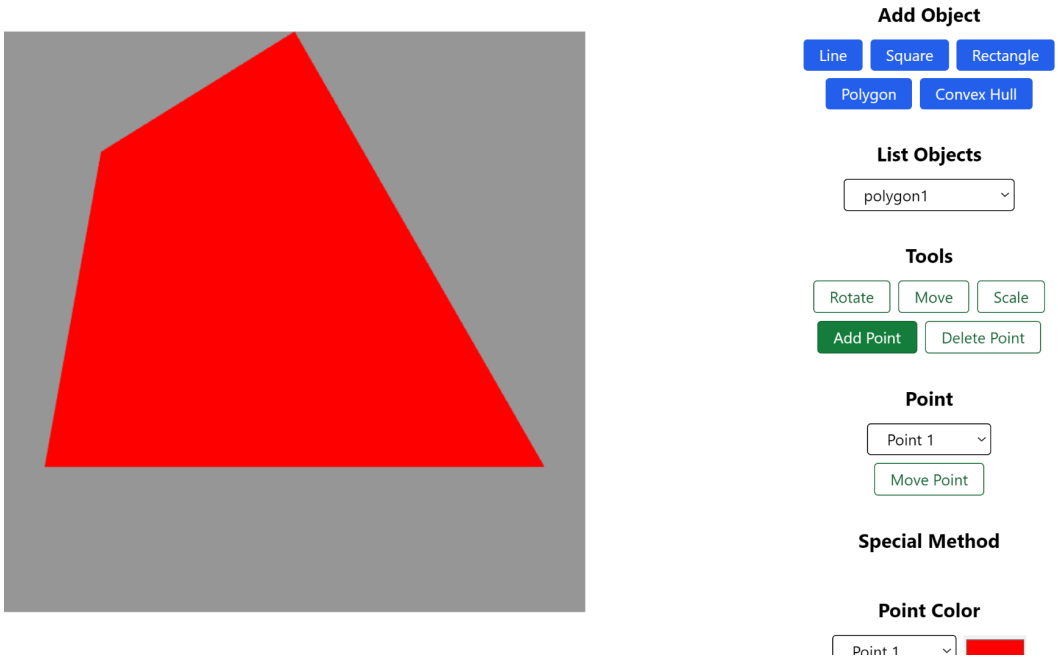




e. Tambah Titik

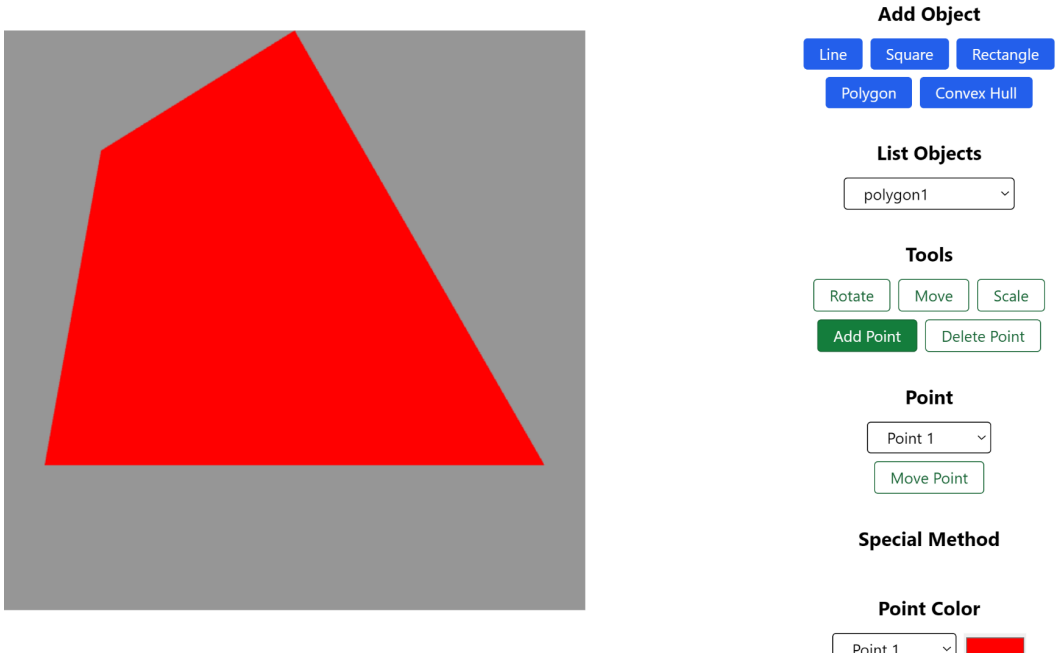


Klik tombol add point

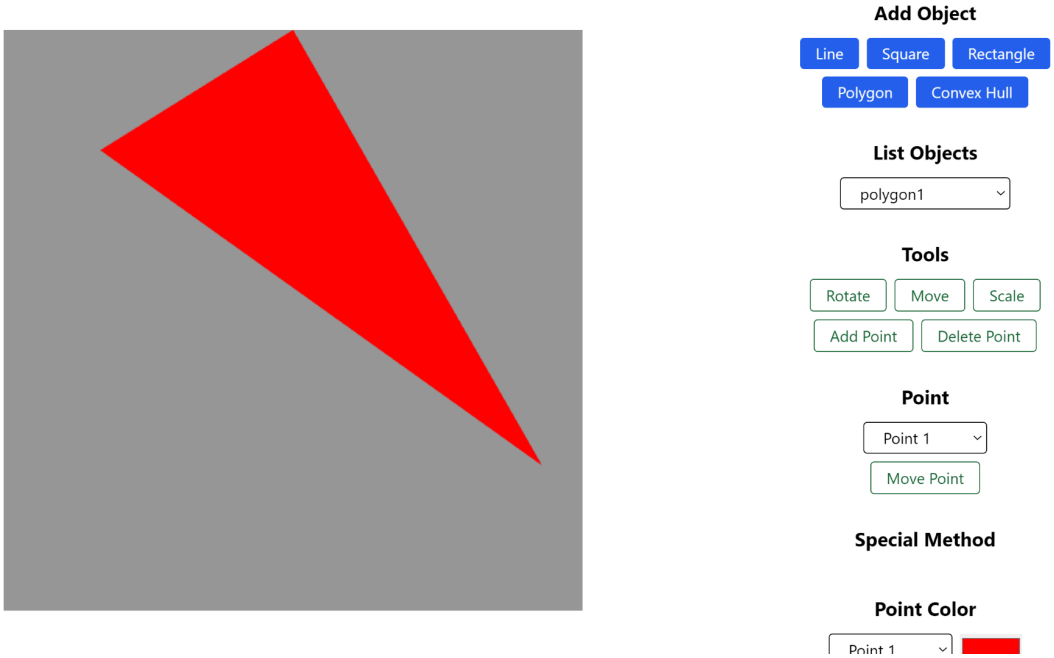


Klik pada canvas untuk menambah titik

f. Hapus Titik

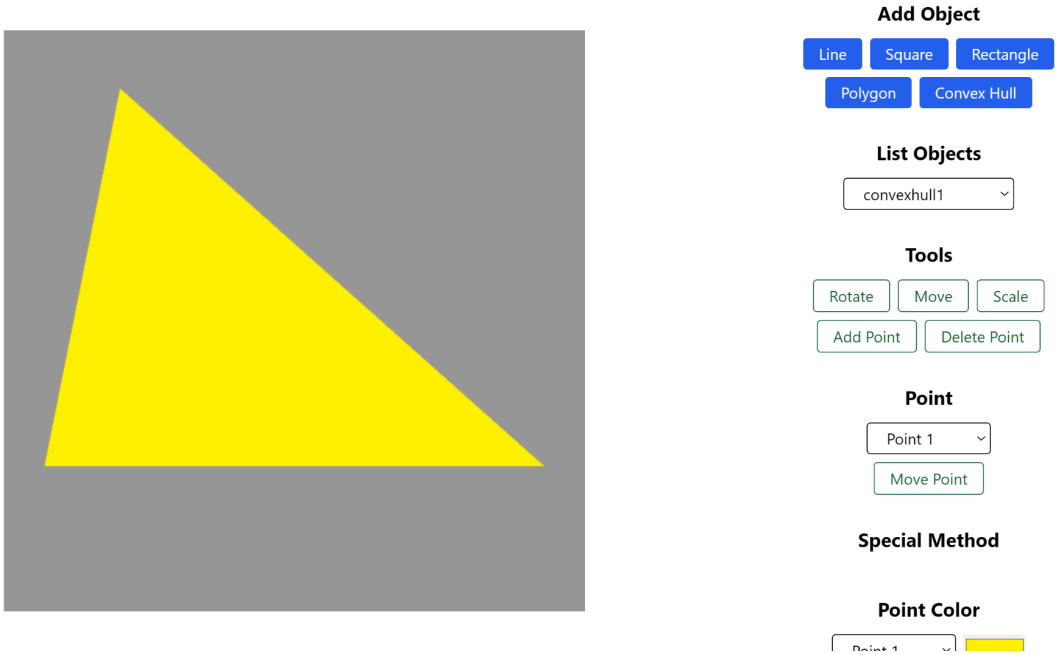


Pilih titik yang akan dihapus

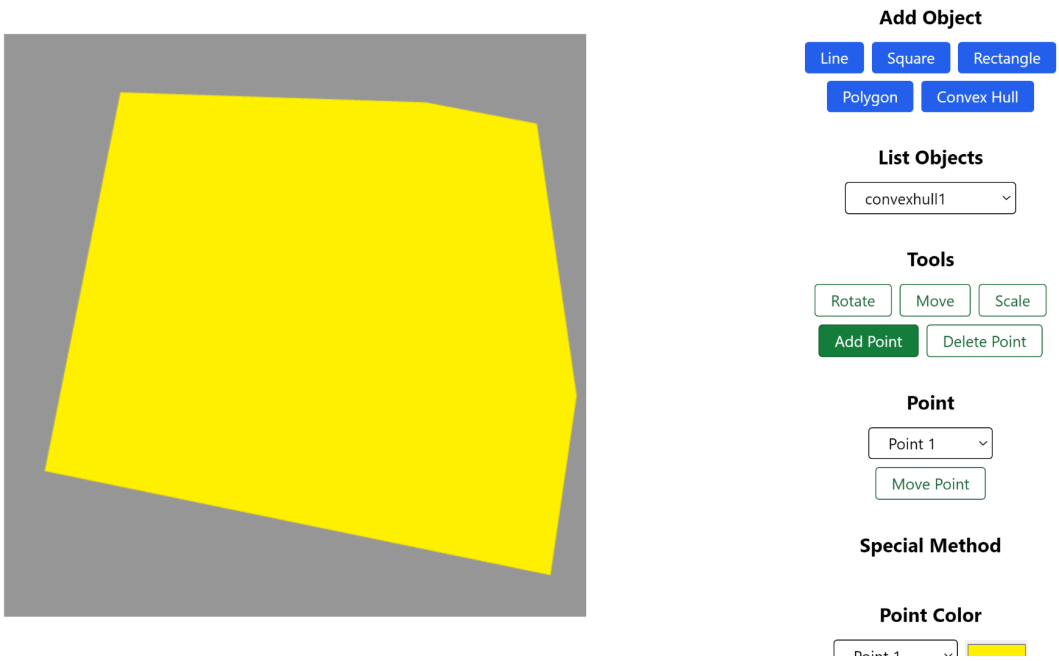


Klik Delete Point untuk menghapus titik

g. Convex Hull



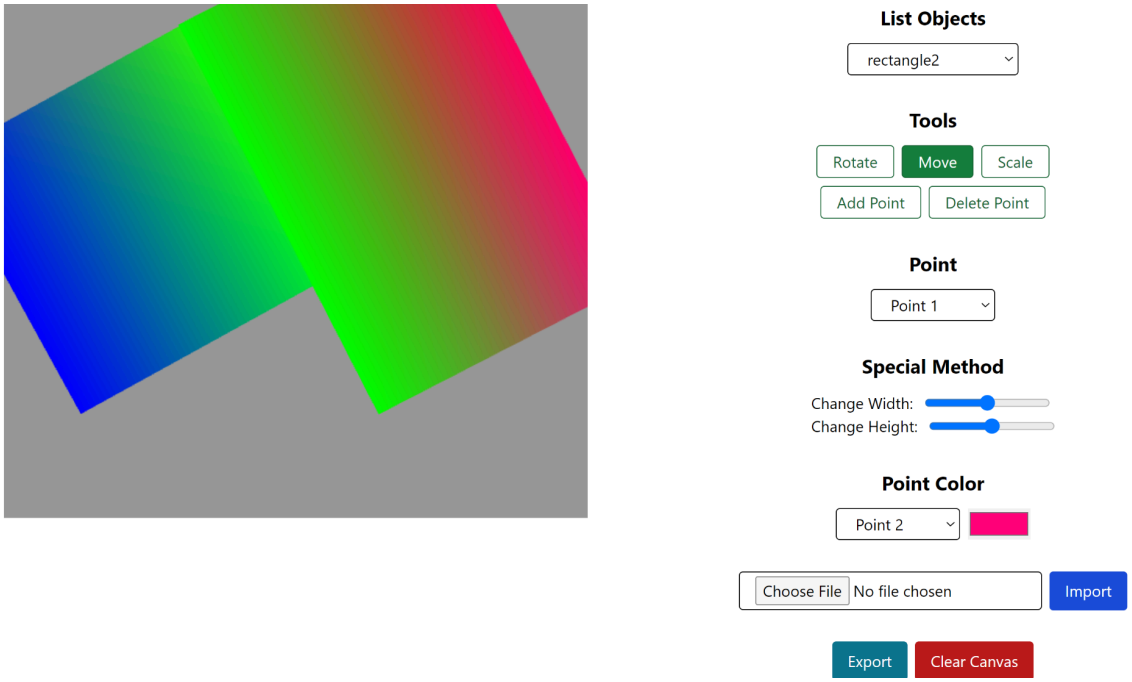
Buat objek Convex Hull



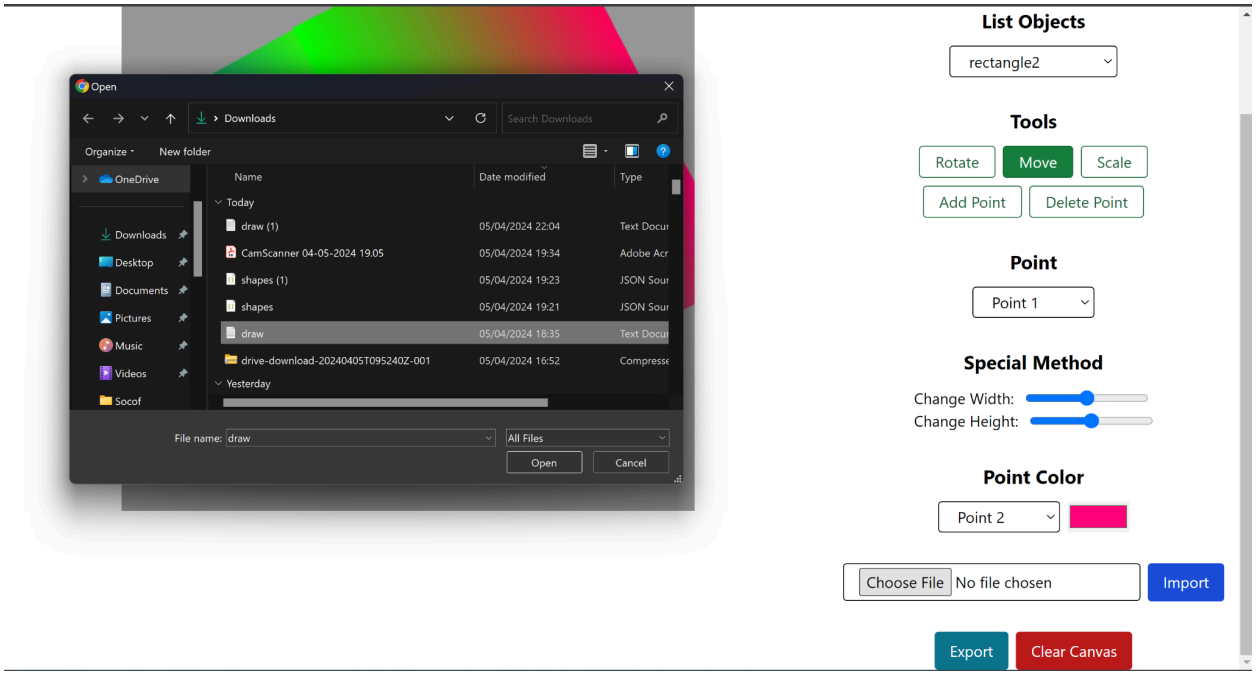
Tambahkan titik

5. Import & Export

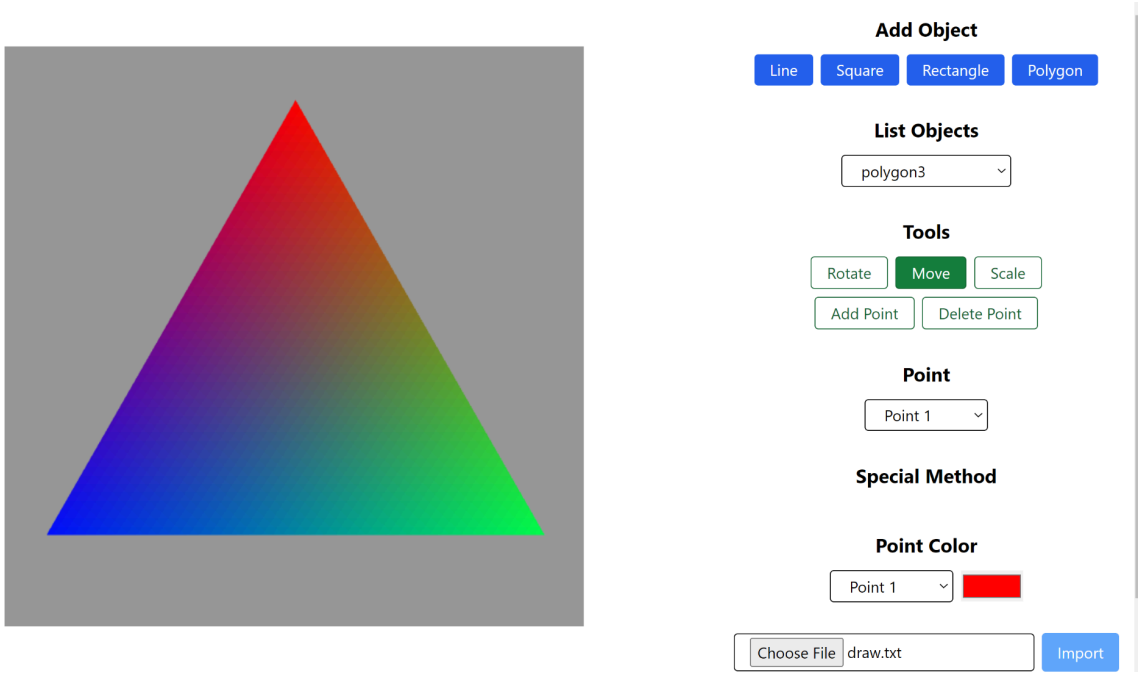
a. Import



Klik Choose File

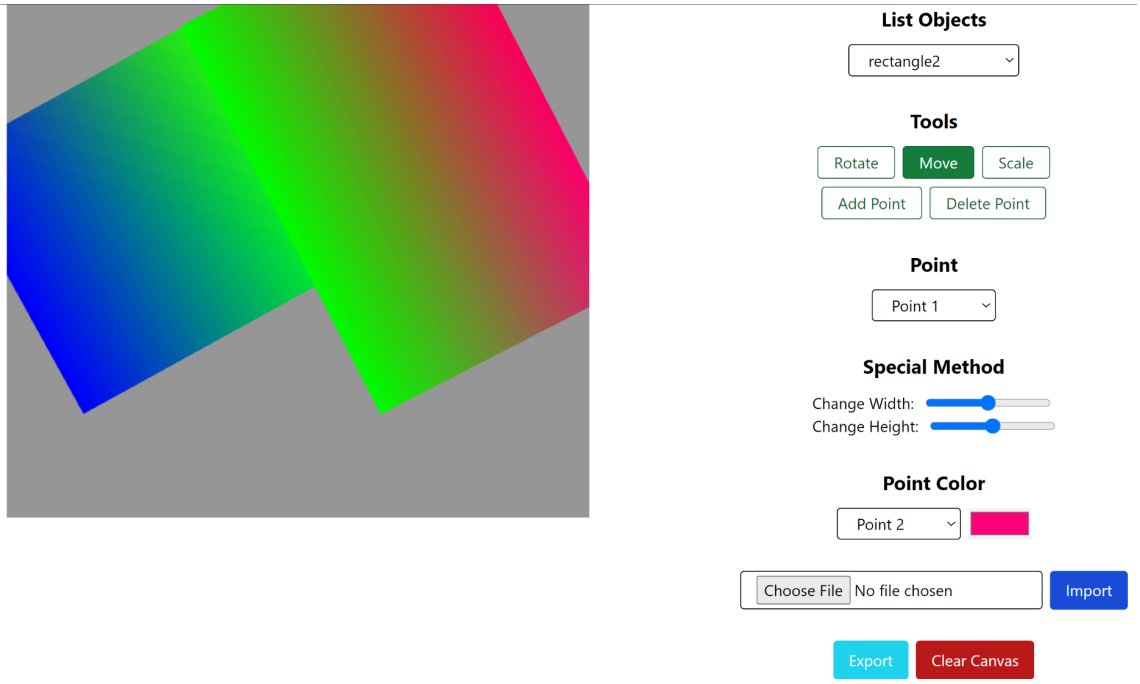


Pilih file yang ingin diimport

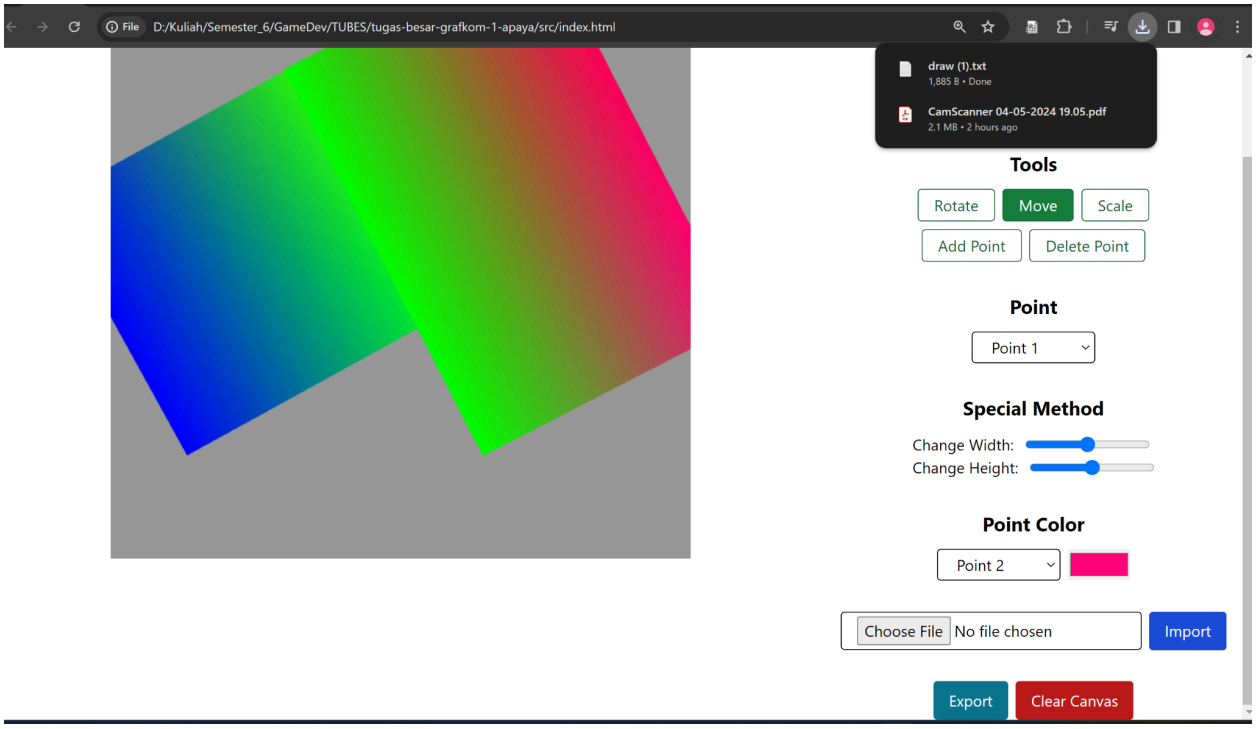


Klik Import untuk membuka gambar di dalam file

b. Export



Klik Export



Canvas akan diunduh melalui web browser