# VEX Platform

## Setup & Implementation Guide

## 1. Project Overview

**VEX Platform** is a 3D virtual exhibition platform that provides immersive exhibition experiences with professional 3D navigation similar to video games.

**Key Features (To Be Implemented):**
• 3D Exhibition Halls with WASD navigation
• Booth Management System
• Real-time multiplayer interactions
• Video/Audio chat capabilities
• Analytics and reporting
• Admin, Booth Owner, and Visitor roles

## 2. Technology Stack

• **Framework:** Next.js 14 (App Router)
• **Language:** TypeScript
• **3D Engine:** Three.js with React Three Fiber
• **Database:** MongoDB with Mongoose
• **Styling:** Tailwind CSS
• **Real-time:** Socket.io (to be added)

## 3. System Requirements

**Required Software:**
• Node.js v18.0.0 or higher
• npm v9.0.0 or higher
• MongoDB v6.0 or higher
• Git (latest version)

**Recommended:**
• RAM: 8GB minimum, 16GB recommended
• Storage: 5GB free space
• Browser: Chrome, Firefox, or Edge (latest)
• OS: Windows 10/11, macOS 12+, or Ubuntu 20.04+

## 4. Installation Steps

**Step 1: Install Node.js**
Check if Node.js is installed: `node --version`
If not, download from: https://nodejs.org/

**Step 2: Install MongoDB**
Option A: Install locally from https://www.mongodb.com/try/download/community
Option B: Use MongoDB Atlas (cloud) - Free tier available

**Step 3: Setup Project**
Navigate to project folder and run: `npm install`

## 5. Environment Configuration

Create a `.env.local` file in the project root with:

```
MONGODB_URI=mongodb://localhost:27017/vex-platform
MONGODB_DB=vex-platform
NEXT_PUBLIC_APP_URL=http://localhost:3000
JWT_SECRET=dev-secret-key-change-in-production
```

For MongoDB Atlas, use connection string format:
`mongodb+srv://username:password@cluster.mongodb.net/vex-platform`

## 6. Running the Application

**Development Mode:**
```
npm run dev
```

**Build for Production:**
```
npm run build
npm start
```

**Access the Application:**
• Main URL: http://localhost:3000
• Health Check: http://localhost:3000/api/health

## 7. Project Structure

```
vex-platform/
■■■ app/ ..................... Next.js App Router
■ ■■■ api/ ................. API Routes
■ ■■■ globals.css .......... Global styles
■ ■■■ layout.tsx ........... Root layout
■ ■■■ page.tsx ............. Home page
■■■ lib/ ..................... Utility functions
■ ■■■ mongodb.ts ........... MongoDB connection
■ ■■■ mongoose.ts .......... Mongoose connection
■■■ types/ ................... TypeScript definitions
■■■ components/ .............. React components
■■■ public/ .................. Static files
```

## 8. Next Steps for Implementation

**Phase 1: Authentication System**
• Create user registration API
• Implement login/logout
• Add JWT token management

**Phase 2: Database Models**

• User, Exhibition Hall, Booth, Product models

**Phase 3: 3D Scene**
• Create basic Three.js scene
• Implement WASD navigation
• Add camera controls

**Phase 4: Booth System**
• Booth creation and customization
• Product upload system

**Phase 5: Real-time Features**
• WebSocket integration
• Multiplayer avatars
• Chat and video calling

## 9. Troubleshooting

**MongoDB Connection Error:**
Ensure MongoDB service is running. Check with `mongod --version`

**Port Already in Use:**
Use different port: `npm run dev -- -p 3001`

**Module Not Found:**
Clear cache: `rm -rf node_modules && npm install`

**Environment Variables Not Loading:**
Restart dev server after changing .env.local

## 10. Additional Resources

• Next.js Docs: https://nextjs.org/docs
• React Three Fiber: https://docs.pmnd.rs/react-three-fiber
• MongoDB Docs: https://www.mongodb.com/docs/
• Tailwind CSS: https://tailwindcss.com/docs

**Support:**
• Next.js Discord: https://nextjs.org/discord
• Three.js Discord: https://discord.gg/poimandres

# Ready to Build!

Run `npm run dev` to start development

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