**⚡ Performance Requirements**

* **Page Load Time:**  
  Pages (including effect previews) should load in under **1 second** on a standard broadband connection.
* **Modal Generation Speed:**  
  Modal HTML with effect code should render in **< 100 ms** using caching.
* **Scalability:**  
  The system should efficiently support **1000+ effects** without UI lag or noticeable slowdowns.
* **Concurrent Users:**  
  The site should support **at least 100 simultaneous users** without performance degradation (in future production deployment).

**🔒 Security Requirements**

* **Code Injection Protection:**  
  All user-submitted content must be sanitized to prevent **XSS** and **HTML injection** attacks.
* **Password Security:**  
  Passwords must be stored using **bcrypt** or similar hashing algorithms.
* **Role-Based Access Control (RBAC):**  
  Different access levels must be enforced for guests, users, and admins.
* **Rate Limiting:**  
  API and form submissions should be rate-limited to prevent brute-force and spam attacks.

**🛠️ Maintainability Requirements**

* **Modular Codebase:**  
  Backend and frontend should be separated into **clear, reusable modules** (MVC or component-based structure).
* **Code Documentation:**  
  All major functions and routes should be well-documented for future developers.
* **Database Flexibility:**  
  SQLite is used for demo, but the system should be easily **migratable to PostgreSQL/MySQL** for production.
* **Configurable Settings:**  
  Environment variables should be used for sensitive settings (e.g., database URLs, API keys).

**🌐 Usability Requirements**

* **User-Friendly UI:**  
  Clean, modern interface with easy navigation and consistent layout across pages.
* **Accessibility:**  
  Follow **WCAG 2.1** guidelines where possible: contrast ratio, keyboard navigation, alt text.
* **Multilingual Support:**  
  Language switching (RU/EN) must be consistent across all pages and persist in user sessions.

**🧪 Testability Requirements**

* **Unit and Integration Testing:**  
  All backend routes and key components should have test coverage of at least **70%**.
* **Automated Testing Ready:**  
  The project structure must support frameworks like **PyTest**, **Jest**, or **Selenium** for future CI/CD integration.

**📈 Reliability & Availability**

* **Uptime Goal:**  
  For production deployment, uptime should aim for **99.5%+** monthly availability.
* **Graceful Error Handling:**  
  The system must provide **user-friendly error messages** for 404, 500, and other errors.
* **Backup Strategy:**  
  Admin tools should include **export or backup** options for the effects database.