Components

1. រចនាសម្ព័ន្ធ

Components គឺជាបំណែកតូចៗនៃ User Interface ដែលយើងអាចយកមកប្រើឡើងវិញបាន (Reusable)។ Components ត្រូវបានបង្កើតឡើងដោយប្រើ Vue.js instances (Single File Components) ដែលរួមមាន HTML, CSS និង JavaScript នៅក្នុងឯកសារតែមួយ (`.vue`)។

Nuxt 4 Component របស់អ្នកត្រូវស្ថិតនៅទីតាំង៖ `app/components/`

- ឧទាហរណ៍រចនាសម្ព័ន្ធ៖

```
my-nuxt-app/
/—— app/
|   /—— components/
|   |   /—— HelloWorld.vue
|   └—— app.vue
/—— nuxt.config.ts
└—— package.json
```

2. ការបង្កើត និងប្រើប្រាស់ Components

Nuxt 4 នៅតែរក្សាមុខងារ **Auto-import** ដែលមានន័យថាអ្នកមិនចាំបាច់សរសេរ `import` នៅក្នុង `<script>` នោះទេ។

ឧទាហរណ៍១ Basic Component

- **creat** - app/components/HelloWorld.vue

```
<template>
  <p>Hello world from Nuxt 4</p>
</template>
```

- **use** - app/app.vue

```
<template>
  <div>
    <h1>Welcome Nuxt 4</h1>
    <HelloWorld />
  </div>
</template>
```

3. Nested Components

អ្នកអាចបង្កើត Component នៅក្នុង Folder បន្ថែម ឈ្មោះរបស់វាត្រូវហៅតាមឈ្មោះ Folder បូកនឹងឈ្មោះ File។
ឧទាហរណ៍៖ ទីតាំង File៖ `app/components/base/button/Primary.vue` ឈ្មោះប្រើប្រាស់៖ `<BaseButtonPrimary />`

4. Dynamic & Server Components

មានភាពងាយស្រួលក្នុងការគ្រប់គ្រងការ Render៖

- **Lazy Loading**: ប្រសិនបើចង់ឱ្យ Component Load តែពេលត្រូវការ ដួយឱ្យ Web ដំណើរការបានលឿន អ្នកគ្រាន់តែថែម ពាក្យ `Lazy` ពីមុខឈ្មោះ។
  ឧទាហរណ៍៖ `<LazyAppHeader />`
- **Server Components**: ប្រសិនបើអ្នកចង់ឱ្យ Component ដំណើរការតែនៅលើ Server កាត់បន្ថយ JavaScript ទៅ Client អ្នកអាចបង្កើត File ឈ្មោះ៖ `MyComponent.server.vue` ។

5. ឧទាហរណ៍ mini project Apple Store

- មានគម្រូ index.html

```
<script setup>
import { ref, watch, onMounted } from 'vue'

const isMenuOpen = ref( false )

// Disable body scroll when menu is open
watch( isMenuOpen, ( val ) => {
    document.body.style.overflow = val ? 'hidden' : ''
})

// Animate on scroll
onMounted( ( ) => {
    const observer = new IntersectionObserver(
        ( entries ) => {
            entries.forEach( entry => {
                // If the element is visible in the viewport
                if ( entry.isIntersecting ) {
                    entry.target.classList.add( 'fade-in-on-scroll' ) // Trigger animation
                    observer.unobserve( entry.target ) // Stop observing once animated
                }
            })
        },
        { threshold: 0.2 } // 20% of element visible triggers animation
    )

    // Observe all elements with class "animate-on-scroll"
    document.querySelectorAll( '.animate-on-scroll' ).forEach( el => observer.observe( el ) )
})
</script>

<template>
    <div class="flex flex-col min-h-screen font-sans bg-white text-[#1d1d1f]">

        <!-- Header -->
        <header class="sticky top-0 z-50 bg-black/85 backdrop-blur-md text-white py-3">
            <div class="max-w-[1000px] mx-auto px-5 flex justify-between items-center relative z-50">
                <h1 class="text-xl font-semibold tracking-tight">Apple Store</h1>

                <!-- Desktop Navigation -->
                <nav class="hidden md:flex space-x-6">
                    <a class="nav-link text-[0.85rem] opacity-80 hover:opacity-100 cursor-pointer">Store</a>
                    <a class="nav-link text-[0.85rem] opacity-80 hover:opacity-100 cursor-pointer">Mac</a>
                    <a class="nav-link text-[0.85rem] opacity-80 hover:opacity-100 cursor-pointer">iPhone</a>
                    <a class="nav-link text-[0.85rem] opacity-80 hover:opacity-100 cursor-pointer">Support</a>
                </nav>

                <!-- Mobile Hamburger / X -->
                <div class="md:hidden flex items-center relative z-50">
                    <button @click="isMenuOpen = !isMenuOpen" class="focus:outline-none relative z-50">
                        <svg v-if="!isMenuOpen" xmlns="http://www.w3.org/2000/svg" class="h-6 w-6" fill="none"
                            viewBox="0 0 24 24" stroke="currentColor">
                            <path stroke-linecap="round" stroke-linejoin="round" stroke-width="2"
                                d="M4 6h16M4 12h16M4 18h16" />
                        </svg>
                        <svg v-else xmlns="http://www.w3.org/2000/svg" class="h-6 w-6" fill="none" viewBox="0 0 24 24"
                            stroke="currentColor">
                            <path stroke-linecap="round" stroke-linejoin="round" stroke-width="2"
                                d="M6 18L18 6M6 6l12 12" />
```

```
            </svg>
          </button>
        </div>
      </div>
    </header>

    <!-- Mobile Menu Overlay -->
    <transition name="menu-slide">
      <div v-if="isMenuOpen" class="fixed inset-0 z-40 bg-black/90 text-white overflow-y-auto"
        @click="isMenuOpen = false">
        <div class="flex flex-col items-center justify-start py-20 space-y-6 px-5 min-h-screen" @click.stop>
          <a @click="isMenuOpen = false" class="cursor-pointer hover:underline text-xl">Store</a>
          <a @click="isMenuOpen = false" class="cursor-pointer hover:underline text-xl">Mac</a>
          <a @click="isMenuOpen = false" class="cursor-pointer hover:underline text-xl">iPhone</a>
          <a @click="isMenuOpen = false" class="cursor-pointer hover:underline text-xl">Support</a>
        </div>
      </div>
    </transition>

    <!-- Hero -->
    <section class="bg-black text-white pt-28 pb-24 text-center animate-on-scroll">
      <div class="max-w-[900px] mx-auto px-5">
        <h2 class="text-5xl md:text-6xl font-semibold mb-6">iPhone 15 Pro</h2>
        <p class="text-xl text-gray-400 mb-8">Titanium. So strong. So light. So Pro.</p>

        <div class="flex justify-center gap-6 mb-12">
          <button
            class="bg-[#0071e3] text-white px-5 py-2 rounded-full transition transform hover:scale-105">Buy</button>
          <button class="text-[#2997ff] hover:underline transition cursor-pointer">Learn more →</button>
        </div>

        <img src="/images/iphone17.png" class="transition duration-500 hover:scale-110 mx-auto max-h-[420px]" />
      </div>
    </section>

    <!-- Features -->
    <section class="py-24 animate-on-scroll delay-200">
      <div class="max-w-[1100px] mx-auto px-5 text-center">
        <h2 class="text-4xl font-semibold mb-14">Why iPhone 15 Pro</h2>
        <div class="grid grid-cols-1 md:grid-cols-3 gap-12">
          <div class="feature-card animate-on-scroll">
            <div class="feature-icon text-5xl transition duration-500 hover:scale-125 hover:rotate-6">🛡️
            </div>
            <h3 class="feature-title">Titanium Design</h3>
            <p class="feature-text">Aerospace-grade titanium makes it strong and lightweight.</p>
          </div>
          <div class="feature-card animate-on-scroll">
            <div class="feature-icon text-5xl transition duration-500 hover:scale-125 hover:rotate-6">⚡
            </div>
            <h3 class="feature-title">A17 Pro Chip</h3>
            <p class="feature-text">Incredible performance with amazing efficiency.</p>
          </div>
          <div class="feature-card animate-on-scroll">
            <div class="feature-icon text-5xl transition duration-500 hover:scale-125 hover:rotate-6">📷
            </div>
            <h3 class="feature-title">Pro Camera</h3>
            <p class="feature-text">Cinematic photos and stunning 4K Pro video.</p>
          </div>
```

```
            </div>
          </div>
        </section>

        <!-- Products -->
        <main class="flex-1 max-w-[1100px] mx-auto px-5 py-20 w-full animate-on-scroll delay-300">
          <h2 class="text-4xl font-semibold text-center mb-12">Featured Gear</h2>

          <div class="grid grid-cols-1 md:grid-cols-2 lg:grid-cols-3 gap-8">
            <div
              class="bg-[#f5f5f7] p-10 rounded-[24px] text-center transition duration-500 hover:-translate-y-2 hover:scale-105 hove
              <img src="/images/iphone17.png" class="product-img" />
              <h3 class="product-title">iPhone 15 Pro</h3>
              <p class="product-price">$999</p>
              <button class="btn-primary-sm">Buy Now</button>
            </div>
            <div
              class="bg-[#f5f5f7] p-10 rounded-[24px] text-center transition duration-500 hover:-translate-y-2 hover:scale-105 hove
              <img src="/images/macbook.png" class="product-img" />
              <h3 class="product-title">MacBook Air M3</h3>
              <p class="product-price">$1299</p>
              <span class="sold-out">Sold Out</span>
            </div>
            <div
              class="bg-[#f5f5f7] p-10 rounded-[24px] text-center transition duration-500 hover:-translate-y-2 hover:scale-105 hove
              <img src="/images/airpod.png" class="product-img" />
              <h3 class="product-title">AirPods Pro</h3>
              <p class="product-price">$249</p>
              <button class="btn-primary-sm">Buy Now</button>
            </div>
          </div>
        </main>

        <!-- Footer -->
        <footer class="bg-[#f5f5f7] text-[#6e6e73] py-5 border-t border-gray-300 animate-on-scroll">
          <div class="max-w-[1000px] mx-auto px-5 flex flex-col md:flex-row justify-between text-xs">
            <p>© 2026 Phone Shop Inc. All rights reserved.</p>
            <div class="flex gap-4 mt-3 md:mt-0">
              <a class="footer-link hover:underline">Privacy</a>
              <a class="footer-link hover:underline">Terms</a>
              <a class="footer-link hover:underline">Sales</a>
            </div>
          </div>
        </footer>

      </div>
    </template>


    <style scoped>
      /* Keyframes */
      @keyframes fadeUp {
        0% {
          opacity: 0;
          transform: translateY( 40px );
        }

        100% {
```

```css
      opacity: 1;
      transform: translateY( 0 );
    }
  }

  @keyframes fadeDown {
    0% {
      opacity: 0;
      transform: translateY( -20px );
    }

    100% {
      opacity: 1;
      transform: translateY( 0 );
    }
  }

  @keyframes fadeIn {
    0% {
      opacity: 0;
    }

    100% {
      opacity: 1;
    }
  }

  /* Animation classes */
  .fade-up {
    animation: fadeUp 1s ease-out forwards;
  }

  .fade-down {
    animation: fadeDown 0.6s ease-out forwards;
  }

  .fade-in {
    animation: fadeIn 1.5s ease-out forwards;
  }

  /* Scroll-triggered animation */
  .fade-in-on-scroll {
    animation: fadeUp 0.8s ease-out forwards;
  }

  /* Optional delays */
  .delay-200 {
    animation-delay: 0.2s;
  }

  .delay-300 {
    animation-delay: 0.3s;
  }

  .delay-500 {
    animation-delay: 0.5s;
  }
```

```css
/* Slide-down animation for mobile menu */
.menu-slide-enter-active,
.menu-slide-leave-active {
    transition: max-height 0.3s ease, opacity 0.3s ease;
}

.menu-slide-enter-from,
.menu-slide-leave-to {
    max-height: 0;
    opacity: 0;
}

.menu-slide-enter-to,
.menu-slide-leave-from {
    max-height: 500px;
    opacity: 1;
}
</style>
```

5.1 រចនាសម្ព័ន្ធ

```
my-nuxt-app/
├── app/
│   ├── assets/
│   │   └── css/
│   │       ├── main.css
│   ├── components/
│   │   ├── AppHeader.vue
│   │   ├── AppHero.vue
│   │   ├── AppFeature.vue
│   │   ├── AppProduct.vue
│   │   └── AppFooter.vue
│   ├── composables/
│   │   ├── useMobileMenu.ts
│   │   └── useScrollAnimation.ts
│   ├── pages/
│   │   └── index.vue
│   └── app.vue
├── public/
│   └── images/
│       ├── airpod.png
│       ├── iphone17.png
│       └── macbook.png
├── nuxt.config.ts
└── package.json
```

5.2 app/app.vue

```vue
<template>
  <div>
    <NuxtLayout>
     <NuxtPage />
    </NuxtLayout>
  </div>
</template>
```

Nuxt is a powerful Vue.js framework used to build fast, SEO-friendly, and scalable web applications. It provides built-in features like automatic routing, server-side rendering, site generation, and full-stack

edited article by Mr. limvichet, contact 012856917/067878118.

```typescript
import { ref, watch } from 'vue'

export const useMobileMenu = ( ) => {
  const isMenuOpen = ref( false )

  // Disable body scroll when menu is open
  watch( isMenuOpen, ( val ) => {
    document.body.style.overflow = val ? 'hidden' : ''
  })

  // Animate on scroll
  onMounted( ( ) => {
    const observer = new IntersectionObserver(
      ( entries ) => {
        entries.forEach( entry => {
          // If the element is visible in the viewport
          if ( entry.isIntersecting ) {
            entry.target.classList.add( 'fade-in-on-scroll' ) // Trigger animation
            observer.unobserve( entry.target ) // Stop observing once animated
          }
        })
      },
      { threshold: 0.2 } // 20% of element visible triggers animation
    )

    // Observe all elements with class "animate-on-scroll"
    document.querySelectorAll( '.animate-on-scroll' ).forEach( el => observer.observe( el ) )
  })
  return {
    isMenuOpen,
  }
}
```

```typescript
import { onMounted, onUnmounted } from 'vue'

export const useScrollAnimation = ( ) => {
  let observer: IntersectionObserver | null = null

  onMounted(( ) => {
    observer = new IntersectionObserver(
      ( entries ) => {
        entries.forEach( entry => {
          if ( entry.isIntersecting ) {
            entry.target.classList.add( 'fade-in-on-scroll' )
            observer ?.unobserve( entry.target )
          }
        })
      },
      { threshold: 0.2 }
    )

    document
      .querySelectorAll( '.animate-on-scroll' )
      .forEach( el => observer !.observe( el ) )
  })

  onUnmounted(( ) => {
    observer ?.disconnect( )
  })
}
```

```html
<script setup lang="ts">
  import { useMobileMenu } from '@/composables/useMobileMenu'
  const { isMenuOpen } = useMobileMenu( )
</script>


<template>
  <header class="sticky top-0 z--50 bg-black/85 backdrop-blur-md text-white py-3">
    <div class="max-w-[1000px] mx-auto px-5 flex justify-between items-center relative z--50">
      <h1 class="text-xl font-semibold tracking-tight">Apple Store</h1>

      <!-- Desktop Navigation -->
      <nav class="hidden md:flex space-x-6">
        <a class="nav-link text-[0.85rem] opacity-80 hover:opacity-100 cursor-pointer">Store</a>
        <a class="nav-link text-[0.85rem] opacity-80 hover:opacity-100 cursor-pointer">Mac</a>
        <a class="nav-link text-[0.85rem] opacity-80 hover:opacity-100 cursor-pointer">iPhone</a>
        <a class="nav-link text-[0.85rem] opacity-80 hover:opacity-100 cursor-pointer">Support</a>
      </nav>

      <!-- Mobile Hamburger / X -->
      <div class="md:hidden flex items-center relative z--50">
        <button @click="isMenuOpen = !isMenuOpen" class="focus:outline-none relative z--50">
          <svg v-if="!isMenuOpen" xmlns="http://www.w3.org/2000/svg" class="h-6 w-6" fill="none"
            viewBox="0 0 24 24" stroke="currentColor">
            <path stroke-linecap="round" stroke-linejoin="round" stroke-width="2"
              d="M4 6h16M4 12h16M4 18h16" />
          </svg>
          <svg v-else xmlns="http://www.w3.org/2000/svg" class="h-6 w-6" fill="none" viewBox="0 0 24 24"
            stroke="currentColor">
            <path stroke-linecap="round" stroke-linejoin="round" stroke-width="2"
              d="M6 18L18 6M6 6l12 12" />
          </svg>
        </button>
      </div>
    </div>
  </header>

  <!-- Mobile Menu Overlay -->
  <transition name="menu-slide">
    <div v-if="isMenuOpen" class="fixed inset-0 z--40 bg-black/90 text-white overflow-y-auto"
      @click="isMenuOpen = false">
      <div class="flex flex-col items-center justify-start py-20 space-y-6 px-5 min-h-screen" @click.stop>
        <a @click="isMenuOpen = false" class="cursor-pointer hover:underline text-xl">Store</a>
        <a @click="isMenuOpen = false" class="cursor-pointer hover:underline text-xl">Mac</a>
        <a @click="isMenuOpen = false" class="cursor-pointer hover:underline text-xl">iPhone</a>
        <a @click="isMenuOpen = false" class="cursor-pointer hover:underline text-xl">Support</a>
      </div>
    </div>
  </transition>
</template>
```

5.6 components/AppHero.vue

```vue
<template>
    <section class="bg-black text-white pt-28 pb-24 text-center animate-on-scroll">
        <div class="max-w-[900px] mx-auto px-5">
            <h2 class="text-5xl md:text-6xl font-semibold mb-6">iPhone 15 Pro</h2>
            <p class="text-xl text-gray-400 mb-8">Titanium. So strong. So light. So Pro.</p>

            <div class="flex justify-center gap-6 mb-12">
                <button
                    class="bg-[#0071e3] text-white px-5 py-2 rounded-full transition transform hover:scale-105">Buy</button>
                <button class="text-[#2997ff] hover:underline transition cursor-pointer">Learn more →</button>
            </div>

            <img src="/images/iphone17.png" class="transition duration-500 hover:scale-110 mx-auto max-h-[420px]" />
        </div>
    </section>
</template>
```

5.7 components/AppFeature.vue

```vue
<template>
    <section class="py-24 animate-on-scroll delay-200">
        <div class="max-w-[1100px] mx-auto px-5 text-center">
            <h2 class="text-4xl font-semibold mb-14">Why iPhone 15 Pro</h2>
            <div class="grid grid-cols-1 md:grid-cols-3 gap-12">
                <div class="feature-card animate-on-scroll">
                    <div class="feature-icon text-5xl transition duration-500 hover:scale-125 hover:rotate-6">🛡️
                    </div>
                    <h3 class="feature-title">Titanium Design</h3>
                    <p class="feature-text">Aerospace-grade titanium makes it strong and lightweight.</p>
                </div>
                <div class="feature-card animate-on-scroll">
                    <div class="feature-icon text-5xl transition duration-500 hover:scale-125 hover:rotate-6">⚡
                    </div>
                    <h3 class="feature-title">A17 Pro Chip</h3>
                    <p class="feature-text">Incredible performance with amazing efficiency.</p>
                </div>
                <div class="feature-card animate-on-scroll">
                    <div class="feature-icon text-5xl transition duration-500 hover:scale-125 hover:rotate-6">📷
                    </div>
                    <h3 class="feature-title">Pro Camera</h3>
                    <p class="feature-text">Cinematic photos and stunning 4K Pro video.</p>
                </div>
            </div>
        </div>
    </section>
</template>
```

```
<template>
    <main class="flex-1 max-w-[1100px] mx-auto px-5 py-20 w-full animate-on-scroll delay-300">
        <h2 class="text-4xl font-semibold text-center mb-12">Featured Gear</h2>

        <div class="grid grid-cols-1 md:grid-cols-2 lg:grid-cols-3 gap-8">
            <div
                class="bg-[#f5f5f7] p-10 rounded-[24px] text-center transition duration-500 hover:-translate-y-2 hover:scale-105 hover:sh
                <img src="/images/iphone17.png" class="product-img" />
                <h3 class="product-title">iPhone 15 Pro</h3>
                <p class="product-price">$999</p>
                <button class="btn-primary-sm">Buy Now</button>
            </div>
            <div
                class="bg-[#f5f5f7] p-10 rounded-[24px] text-center transition duration-500 hover:-translate-y-2 hover:scale-105 hover:sh
                <img src="/images/macbook.png" class="product-img" />
                <h3 class="product-title">MacBook Air M3</h3>
                <p class="product-price">$1299</p>
                <span class="sold-out">Sold Out</span>
            </div>
            <div
                class="bg-[#f5f5f7] p-10 rounded-[24px] text-center transition duration-500 hover:-translate-y-2 hover:scale-105 hover:sh
                <img src="/images/airpod.png" class="product-img" />
                <h3 class="product-title">AirPods Pro</h3>
                <p class="product-price">$249</p>
                <button class="btn-primary-sm">Buy Now</button>
            </div>
        </div>
    </main>
</template>
```

```
<template>
    <footer class="bg-[#f5f5f7] text-[#6e6e73] py-5 border-t border-gray-300 animate-on-scroll">
        <div class="max-w-[1000px] mx-auto px-5 flex flex-col md:flex-row justify-between text-xs">
            <p>© 2026 Phone Shop Inc. All rights reserved.</p>
            <div class="flex gap-4 mt-3 md:mt-0">
                <a class="footer-link hover:underline">Privacy</a>
                <a class="footer-link hover:underline">Terms</a>
                <a class="footer-link hover:underline">Sales</a>
            </div>
        </div>
    </footer>
</template>
```

Nuxt is a powerful Vue.js framework used to build fast, SEO-friendly, and scalable web applications. It provides built-in features like automatic routing, server-side rendering, site generation, and full-stack

```
<script setup type=ts>
  import { useScrollAnimation } from '@/composables/useScrollAnimation'
  useScrollAnimation( )
</script>

<template>
    <div class="flex flex-col min-h-screen font-sans bg-white text-[#1d1d1f]">

      <!-- Header -->
      <app-header />

      <!-- Hero -->
      <app-hero />

      <!-- Features -->
      <app-feature />

      <!-- Products -->
      <app-products />

      <!-- Footer -->
      <AppFooter />

    </div>
</template>
```

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```css
@import "tailwindcss";

/* Keyframes */
@keyframes fadeUp {
    0% {
        opacity: 0;
        transform: translateY( 40px );
    }

    100% {
        opacity: 1;
        transform: translateY( 0 );
    }
}

@keyframes fadeDown {
    0% {
        opacity: 0;
        transform: translateY( -20px );
    }

    100% {
        opacity: 1;
        transform: translateY( 0 );
    }
}

@keyframes fadeIn {
    0% {
        opacity: 0;
    }

    100% {
        opacity: 1;
    }
}

/* Animation classes */
.fade-up {
    animation: fadeUp 1s ease-out forwards;
}

.fade-down {
    animation: fadeDown 0.6s ease-out forwards;
}

.fade-in {
    animation: fadeIn 1.5s ease-out forwards;
}

/* Scroll-triggered animation */
.fade-in-on-scroll {
    animation: fadeUp 0.8s ease-out forwards;
}

/* Optional delays */
```

```css
.delay-200 {
    animation-delay: 0.2s;
}

.delay-300 {
    animation-delay: 0.3s;
}

.delay-500 {
    animation-delay: 0.5s;
}

/* Slide-down animation for mobile menu  */
.menu-slide-enter-active,
.menu-slide-leave-active {
    transition: max-height 0.3s ease, opacity 0.3s ease;
}

.menu-slide-enter-from,
.menu-slide-leave-to {
    max-height: 0;
    opacity: 0;
}

.menu-slide-enter-to,
.menu-slide-leave-from {
    max-height: 500px;
    opacity: 1;
}
```

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