Frontend Development Roadmap

9-Week Intensive Training Program

HTML + CSS + JavaScript + React + TypeScript + Tailwind

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Week 1: HTML & CSS Fundamentals + Semantic HTML

■ Focus

Goal: Master HTML structure, semantic elements, and CSS fundamentals for building accessible, well-structured web pages.

Core Concepts (80/20):

- HTML document structure (DOCTYPE, head, body)
- Semantic HTML5 elements (header, nav, main, section, article, footer)
- Forms and input types
- CSS selectors (class, id, attribute, pseudo-classes)
- Box model (margin, border, padding, content)
- Display properties (block, inline, inline-block)
- Basic positioning (static, relative, absolute, fixed)

■ SIMPLE LEVEL - HTML Structure & Basic CSS

1. Create a basic HTML page with proper DOCTYPE, head (meta tags, title), and body

Concept: HTML structure

2. Build a simple personal profile page using semantic HTML (header, main, footer)

Concept: Semantic HTML

3. Create a navigation menu using nav and ul/li elements

Concept: Navigation structure

4. Style text using CSS (font-family, font-size, color, line-height, text-align)

Concept: Typography

5. Apply the box model to create spacing between elements

Concept: Box model

6. Create a simple contact form with various input types (text, email, textarea, submit)

Concept: Forms

7. Use class and id selectors to style specific elements

Concept: CSS selectors

■ Outcome: You can create well-structured HTML pages and apply basic CSS styling.

■ INTERMEDIATE LEVEL - Advanced CSS & Layouts

1. Build a two-column layout using float or inline-block

Concept: Layout techniques

2. Create a responsive navigation that collapses on mobile (using media queries)

Concept: Responsive design

3. Style a card component with hover effects using pseudo-classes

Concept: Interactive CSS

4. Use CSS specificity to override styles correctly

Concept: CSS cascade

5. Create a pricing table with alternating row colors using nth-child

Concept: Advanced selectors

6. Build a hero section with background image and overlay

Concept: Background properties

7. Implement form validation styling using :valid and :invalid pseudo-classes

Concept: Form UX

■ Outcome: You can create responsive layouts and apply advanced CSS techniques.

■ HARD LEVEL - Accessibility & Best Practices

1. Build a fully accessible form with proper labels, ARIA attributes, and keyboard navigation

Concept: Accessibility

2. Create a complete blog post layout using semantic HTML5 elements

Concept: Semantic structure

3. Implement skip-to-content link for screen readers

Concept: A11y patterns

4. Optimize page load by minimizing CSS and using proper asset loading

Concept: Performance

5. Create a modal dialog with focus trap and ESC key handling (CSS + minimal JS)

Concept: UX patterns

6. Build a responsive image gallery with proper alt text and figure/figcaption

Concept: Images & SEO

7. Validate HTML using W3C validator and fix all errors

Concept: Standards compliance

■ Outcome: You can build accessible, semantic, and standards-compliant web pages.

■ Bonus Challenges

• Create a custom checkbox and radio button using CSS only

• Build a responsive table that transforms into cards on mobile

- Implement a CSS-only accordion menu
- Create a loading spinner animation using CSS
- Build a complete landing page with header, features section, and footer

Week 2: CSS Flexbox & Grid Layout Systems

■ Focus

Goal: Master modern CSS layout systems (Flexbox and Grid) to create complex, responsive layouts efficiently.

Core Concepts (80/20):

- Flexbox: flex-direction, justify-content, align-items, flex-wrap
- Flex item properties: flex-grow, flex-shrink, flex-basis
- Grid: grid-template-columns, grid-template-rows, gap
- Grid placement: grid-column, grid-row, grid-area
- Responsive layouts with auto-fit and minmax
- Combining Flexbox and Grid
- When to use Flexbox vs Grid

■ SIMPLE LEVEL - Flexbox Basics

1. Create a horizontal navigation bar using Flexbox

Concept: Flexbox fundamentals

2. Build a card layout with evenly distributed items

Concept: justify-content

3. Center an element both horizontally and vertically

Concept: Centering techniques

4. Create a responsive header with logo and navigation

Concept: Flex alignment

5. Build a footer with social icons evenly spaced

Concept: Space distribution

6. Make a flexible sidebar layout that wraps on small screens

Concept: flex-wrap

7. Create a pricing card with footer pushed to bottom

Concept: flex-grow

■ Outcome: You can create flexible, responsive layouts using Flexbox.

■ INTERMEDIATE LEVEL - CSS Grid Mastery

1. Build a 12-column grid layout system from scratch

Concept: Grid fundamentals

2. Create a magazine-style layout with varying column spans

Concept: Grid placement

3. Build a responsive image gallery using Grid auto-fit

Concept: Responsive Grid

4. Create a dashboard layout with header, sidebar, main, and footer

Concept: Grid areas

5. Implement a card grid that adjusts columns based on screen size

Concept: minmax and auto-fit

6. Build a masonry-like layout using Grid

Concept: Advanced Grid

7. Create a form layout using Grid for label/input alignment

Concept: Practical Grid

■ Outcome: You can build complex layouts efficiently using CSS Grid.

■ HARD LEVEL - Advanced Layouts & Combinations

1. Build a complete admin dashboard combining Grid and Flexbox

Concept: Layout composition

2. Create a Netflix-style responsive grid with varying aspect ratios

Concept: Complex Grid

3. Implement a calendar layout using CSS Grid

Concept: Grid application

4. Build a Kanban board layout with drag-and-drop zones (CSS only)

Concept: Advanced layout

5. Create a newspaper-style layout with grid-template-areas

Concept: Named grid areas

6. Implement a responsive pricing table that changes layout at breakpoints

Concept: Responsive design

7. Build a complete e-commerce product page layout

Concept: Real-world project

■ Outcome: You can create production-ready layouts combining Grid and Flexbox.

■ Bonus Challenges

- Create a Holy Grail layout using Grid
- Build a responsive sidebar that collapses to hamburger menu
- Implement a Pinterest-style masonry grid

- Create a complex form with multi-column layout
- Build a responsive email template layout

Week 3: JavaScript Fundamentals + DOM Manipulation

■ Focus

Goal: Master JavaScript basics, DOM manipulation, and event handling to create interactive web pages.

Core Concepts (80/20):

- Variables (let, const, var) and data types
- Functions (regular, arrow, callbacks)
- Arrays and array methods (map, filter, reduce, forEach)
- Objects and object manipulation
- DOM selection (querySelector, getElementById)
- Event listeners and event handling
- ES6+ features (template literals, destructuring, spread operator)

■ SIMPLE LEVEL - JavaScript Basics

1. Create variables using let and const, understand scope

Concept: Variables & scope

2. Write functions that accept parameters and return values

Concept: Functions

3. Create and manipulate arrays using push, pop, slice

Concept: Array basics

4. Work with objects: create, access, and modify properties

Concept: Objects

5. Use template literals to create dynamic strings

Concept: String templates

6. Write conditional logic using if/else and ternary operators

Concept: Conditionals

7. Create loops using for, while, and forEach

Concept: Iteration

■ Outcome: You understand JavaScript fundamentals and can write basic scripts.

■ INTERMEDIATE LEVEL - DOM Manipulation & Events

1. Select DOM elements using querySelector and querySelectorAll

Concept: DOM selection

2. Add click event listeners to buttons and handle events

Concept: Event handling

3. Dynamically create and append elements to the DOM

Concept: DOM creation

4. Modify element styles and classes using JavaScript

Concept: Style manipulation

5. Build a todo list with add and delete functionality

Concept: Practical project

6. Handle form submissions and prevent default behavior

Concept: Form handling

7. Use array methods (map, filter, reduce) to transform data

Concept: Functional programming

■ Outcome: You can manipulate the DOM and create interactive web pages.

■ HARD LEVEL - Advanced JavaScript & Patterns

1. Implement event delegation for dynamic elements

Concept: Event patterns

2. Create a modal component with open/close functionality and keyboard support

Concept: Component building

3. Build a filterable search interface using array methods

Concept: Data filtering

4. Implement debounce function for search input

Concept: Performance optimization

5. Create a tab component that switches content dynamically

Concept: UI components

6. Build a simple calculator with all basic operations

Concept: State management

7. Implement local storage to persist todo list data

Concept: Data persistence

■ Outcome: You can build complex interactive features with clean JavaScript patterns.

■ Bonus Challenges

- Build an image carousel with previous/next buttons
- Create a countdown timer

- Implement a drag-and-drop sortable list
- Build a character counter for textarea
- Create a theme toggle (dark/light mode)

Week 4: Async JavaScript + Fetch API + JSON

■ Focus

Goal: Master asynchronous JavaScript, work with APIs, and handle JSON data in real-world applications.

Core Concepts (80/20):

- Promises and promise chaining
- Async/await syntax
- Fetch API for HTTP requests
- Working with JSON data
- Error handling (try/catch, .catch())
- HTTP methods (GET, POST, PUT, DELETE)
- CORS and API authentication basics

■ SIMPLE LEVEL - Promises & Fetch Basics

1. Create and resolve a simple Promise

Concept: Promise fundamentals

2. Use fetch() to GET data from a public API (JSONPlaceholder)

Concept: Fetch API

3. Parse JSON response and display in console

Concept: JSON parsing

4. Display fetched data in the DOM (list of users/posts)

Concept: Data rendering

5. Handle fetch errors using .catch()

Concept: Error handling

6. Add loading state while data is being fetched

Concept: UX patterns

7. Use async/await instead of .then() for cleaner code

Concept: Async/await

■ Outcome: You can fetch and display data from APIs using async JavaScript.

■ INTERMEDIATE LEVEL - Working with APIs

1. Build a weather app that fetches data from OpenWeatherMap API

Concept: Real API integration

2. Implement POST request to create new resource

Concept: POST requests

3. Add search functionality to filter API results

Concept: Dynamic queries

4. Display error messages to users when API fails

Concept: Error UX

5. Implement pagination for API results

Concept: Data pagination

6. Cache API responses to avoid repeated requests

Concept: Performance

7. Work with multiple API endpoints and combine data

Concept: Data aggregation

■ Outcome: You can build applications that consume real APIs and handle data effectively.

■ HARD LEVEL - Advanced Async Patterns

1. Build a GitHub user search app with profile and repositories

Concept: Complete API app

2. Implement retry logic for failed API requests

Concept: Resilience

3. Use Promise.all() to fetch multiple resources simultaneously

Concept: Parallel requests

4. Add request cancellation using AbortController

Concept: Request management

5. Implement infinite scroll with API pagination

Concept: Advanced UX

6. Handle rate limiting and API quota errors gracefully

Concept: Error handling

7. Build a news aggregator fetching from multiple APIs

Concept: Complex integration

■ Outcome: You can build robust applications with advanced async patterns and error handling.

■ Bonus Challenges

- Build a cryptocurrency price tracker
- Create a movie search app using OMDB API
- Implement a recipe finder with filtering

- Build a REST API client with full CRUD operations
- Create a real-time chat using WebSocket basics

Week 5: React Fundamentals + Components + Props + State

■ Focus

Goal: Learn React basics, component architecture, props, state, and build reusable UI components.

Core Concepts (80/20):

- • JSX syntax and JavaScript in JSX
- • Functional components
- • Props and prop drilling
- • useState hook for state management
- • Event handling in React
- • Conditional rendering
- • Lists and keys

■ SIMPLE LEVEL - React Basics

1. Set up a React app using Vite or Create React App

Concept: Environment setup

2. Create a simple functional component that displays JSX

Concept: Components

3. Pass props to a child component and render them

Concept: Props

4. Use useState to manage a counter with increment/decrement

Concept: State basics

5. Handle button clicks and update state

Concept: Event handling

6. Conditionally render elements based on state

Concept: Conditional rendering

7. Render a list of items using map() and keys

Concept: Lists

■ Outcome: You understand React fundamentals and can build simple interactive components.

■ INTERMEDIATE LEVEL - Component Composition

1. Build a todo app with add, delete, and toggle complete functionality

Concept: State management

2. Create reusable Button and Input components with props

Concept: Component reusability

3. Implement form handling with controlled components

Concept: Forms in React

4. Lift state up to share data between sibling components

Concept: State lifting

5. Create a modal component that opens/closes based on state

Concept: UI components

6. Build a card grid component that accepts data as props

Concept: Data-driven UI

7. Implement a simple routing structure (manual, no library yet)

Concept: Navigation

■ Outcome: You can compose complex UIs from reusable React components.

■ HARD LEVEL - Advanced State & Patterns

1. Build a multi-step form with state management across steps

Concept: Complex state

2. Implement a shopping cart with add/remove/update quantity

Concept: App state

3. Create a compound component pattern (like Tabs with Tab children)

Concept: Design patterns

4. Optimize re-renders using React.memo

Concept: Performance

5. Build a filterable product list with multiple filters

Concept: Complex filtering

6. Implement optimistic UI updates

Concept: UX patterns

7. Create a custom hook for form validation

Concept: Custom hooks intro

■ Outcome: You can build production-ready React applications with advanced patterns.

■ Bonus Challenges

- Build a tic-tac-toe game with win detection
- Create an accordion component
- Implement a drag-and-drop list

- Build a theme switcher with context
- Create a reusable table component with sorting

Week 6: React Hooks (useEffect, useContext, Custom Hooks)

■ Focus

Goal: Master React hooks for side effects, context API for state management, and creating custom hooks.

Core Concepts (80/20):

- useEffect hook and dependency array
- Cleanup functions in useEffect
- useContext for global state
- useRef for DOM access and persistent values
- Custom hooks for reusable logic
- useReducer for complex state
- Performance optimization with useMemo and useCallback

■ SIMPLE LEVEL - useEffect Basics

1. Use useEffect to log when component mounts

Concept: Effect basics

2. Fetch data from API on component mount using useEffect

Concept: Data fetching

3. Update document title based on state using useEffect

Concept: Side effects

4. Understand dependency array behavior (empty, with deps, no array)

Concept: Dependencies

5. Implement cleanup in useEffect (e.g., clear interval)

Concept: Cleanup

6. Use useRef to focus an input on mount

Concept: useRef basics

7. Create a simple timer with useEffect and cleanup

Concept: Practical example

■ Outcome: You understand useEffect and can handle side effects properly.

■ INTERMEDIATE LEVEL - Context & Custom Hooks

1. Create a Theme Context for dark/light mode across app

Concept: Context API

2. Build an Auth Context to manage user login state

Concept: Global state

3. Create a custom useFetch hook for API calls

Concept: Custom hooks

4. Build a custom useLocalStorage hook

Concept: Reusable logic

5. Implement a custom useToggle hook

Concept: Hook patterns

6. Use useReducer for a complex form with validation

Concept: useReducer

7. Combine multiple contexts with Context composition

Concept: Advanced context

■ Outcome: You can manage complex state with hooks and create reusable custom hooks.

■ HARD LEVEL - Advanced Hooks & Optimization

1. Build a data fetching hook with loading, error, and retry states

Concept: Robust hooks

2. Optimize expensive calculations with useMemo

Concept: Performance

3. Prevent unnecessary re-renders with useCallback

Concept: Optimization

4. Create a custom useDebounce hook for search

Concept: Advanced patterns

5. Build a global notification system using Context

Concept: Complex context

6. Implement infinite scroll with useEffect and IntersectionObserver

Concept: Advanced effects

7. Create a custom useAsync hook for any async operation

Concept: Generic hooks

■ Outcome: You can build performant React apps with advanced hook patterns.

■ Bonus Challenges

- Build a real-time search with debouncing
- Create a custom useWindowSize hook

- Implement a shopping cart with Context
- Build a custom useOnClickOutside hook
- Create a form wizard with multi-step state management

Week 7: TypeScript Fundamentals + React TypeScript

■ Focus

Goal: Learn TypeScript basics and integrate it with React for type-safe applications.

Core Concepts (80/20):

- TypeScript basic types (string, number, boolean, array)
- Interfaces and type aliases
- Function typing and return types
- Typing React components and props
- Typing hooks (useState, useEffect, useRef)
- Generic types
- Union types and optional properties

■ SIMPLE LEVEL - TypeScript Basics

1. Set up a TypeScript project with React (Vite or CRA)

Concept: Environment

2. Define basic types for variables (string, number, boolean)

Concept: Basic types

3. Create interfaces for objects

Concept: Interfaces

4. Type function parameters and return values

Concept: Function typing

5. Use type annotations with arrays

Concept: Array typing

6. Understand union types (string | number)

Concept: Union types

7. Define optional properties in interfaces

Concept: Optional types

■ Outcome: You understand TypeScript fundamentals and can write typed code.

■ INTERMEDIATE LEVEL - React TypeScript

1. Type React functional components with props interface

Concept: Component typing

2. Type useState with proper type inference

Concept: Hook typing

3. Type event handlers (onClick, onChange, onSubmit)

Concept: Event typing

4. Create typed custom hooks

Concept: Custom hook types

5. Type useRef for DOM elements and mutable values

Concept: useRef typing

6. Use generics for reusable components

Concept: Generics

7. Type Context API values and providers

Concept: Context typing

■ Outcome: You can build type-safe React applications with TypeScript.

■ HARD LEVEL - Advanced TypeScript Patterns

1. Build a fully typed form with validation

Concept: Complex typing

2. Type API responses and create type guards

Concept: Type safety

3. Use utility types (Partial, Pick, Omit, Record)

Concept: Utility types

4. Create discriminated unions for state management

Concept: Advanced unions

5. Type a generic data table component

Concept: Generic components

6. Implement proper error typing with Result types

Concept: Error handling

7. Build a type-safe Redux-like state manager

Concept: State typing

■ Outcome: You can leverage advanced TypeScript features for robust applications.

■ Bonus Challenges

- Type a complete authentication flow
- Build a typed API client
- Create typed route parameters

- Implement strict null checking
- Build a type-safe form builder

Week 8: Tailwind CSS + Component Styling + Responsive Design

■ Focus

Goal: Master Tailwind CSS utility classes, build responsive designs, and create styled React components.

Core Concepts (80/20):

- • Tailwind utility classes (spacing, colors, typography)
- • Responsive design with breakpoint modifiers
- • Flexbox and Grid utilities in Tailwind
- • Custom configurations and theme extension
- • Component composition with Tailwind
- • Pseudo-classes (hover, focus, active)
- • Dark mode implementation

■ SIMPLE LEVEL - Tailwind Basics

1. Set up Tailwind CSS in a React project

Concept: Setup

2. Use basic utility classes (padding, margin, colors)

Concept: Utilities

3. Style text with typography utilities

Concept: Typography

4. Create responsive layouts with breakpoint prefixes

Concept: Responsive

5. Use Flexbox utilities to create a navbar

Concept: Flexbox

6. Apply hover and focus states

Concept: Pseudo-classes

7. Create a card component with Tailwind

Concept: Components

■ Outcome: You can style React components efficiently with Tailwind utilities.

■ INTERMEDIATE LEVEL - Advanced Styling

1. Build a complete landing page with Tailwind

Concept: Layout

2. Create reusable button variants with consistent styling

Concept: Component patterns

3. Implement dark mode with Tailwind's dark: modifier

Concept: Dark mode

4. Customize Tailwind config (colors, fonts, spacing)

Concept: Configuration

5. Build a responsive grid gallery

Concept: Grid utilities

6. Create form components with proper spacing and validation states

Concept: Forms

7. Use @apply directive for extracting component classes

Concept: CSS organization

■ Outcome: You can build production-ready UIs with Tailwind and custom configurations.

■ HARD LEVEL - Component Systems

1. Build a complete design system with reusable components

Concept: Design system

2. Create complex responsive layouts (dashboard with sidebar)

Concept: Advanced layouts

3. Implement animations and transitions with Tailwind

Concept: Animations

4. Build a UI component library (buttons, inputs, modals, cards)

Concept: Component library

5. Optimize Tailwind build for production (PurgeCSS)

Concept: Performance

6. Create dynamic class names with clsx or classnames

Concept: Dynamic styling

7. Implement a theme system with CSS variables and Tailwind

Concept: Theming

■ Outcome: You can create scalable, maintainable styling systems with Tailwind.

■ Bonus Challenges

- Build a Spotify clone UI
- Create an e-commerce product page

- Implement a Netflix-style interface
- Build a social media feed UI
- Create animated loading skeletons

Week 9: Final Project - Full-Stack Application

■ Focus

Goal: Build a complete full-stack application integrating all learned concepts: React, TypeScript, Tailwind, and API integration.

Project Requirements:

- React with TypeScript
- Tailwind CSS for styling
- Custom hooks for reusable logic
- Context API for state management
- API integration with proper error handling
- Responsive design (mobile, tablet, desktop)
- Form validation and user feedback
- Loading states and error boundaries
- Dark mode support
- Deployment to production

■ SIMPLE PROJECT IDEAS

1. Todo App with Categories

Features: CRUD operations, filtering, local storage persistence

2. Weather Dashboard

Features: API integration, location-based data, responsive cards

3. Recipe Finder

Features: Search functionality, API calls, detailed view pages

4. Expense Tracker

Features: Data visualization, calculations, category management

5. Movie Search App

Features: External API, infinite scroll, favorites system

■ INTERMEDIATE PROJECT IDEAS

1. E-commerce Product Catalog

Features: Product listing, cart, checkout flow, filters

2. Blog Platform

Features: Posts, comments, user authentication, markdown support

3. Task Management Board (Trello Clone)

Features: Drag-and-drop, multiple boards, task assignment

4. Social Media Dashboard

Features: Feed, posts, likes, comments, user profiles

5. Real Estate Listings

Features: Property search, filters, map integration, favorites

■ HARD PROJECT IDEAS

1. Full-Stack Chat Application

Features: Real-time messaging, user auth, rooms, file uploads

2. Project Management Tool

Features: Multiple projects, teams, tasks, timeline view, analytics

3. Music Streaming App (Spotify Clone)

Features: Playlists, search, player controls, recommendations

4. Video Sharing Platform (YouTube Clone)

Features: Upload, playback, comments, subscriptions, playlists

5. Multi-Vendor Marketplace

Features: Vendor dashboard, product management, orders, reviews, payments

■ Implementation Checklist

- ■ Set up project with Vite + React + TypeScript + Tailwind
- ■ Create component structure and folder organization
- ■ Implement routing with React Router
- ■ Build reusable UI components
- ■ Set up state management (Context or Redux Toolkit)
- ■ Implement API integration with custom hooks
- ■ Add form validation and error handling
- ■ Create responsive layouts for all screen sizes
- ■ Implement dark mode support
- ■ Add loading states and error boundaries
- ■ Write basic tests for critical components
- ■ Optimize performance (code splitting, lazy loading)
- ■ Deploy to Vercel, Netlify, or similar platform
- ■ Document your code and create README

■ Best Practices to Follow

- Component Structure: Keep components small and focused (Single Responsibility)
- Type Safety: Type all props, state, and function parameters
- Error Handling: Always handle loading, error, and empty states
- Accessibility: Use semantic HTML, ARIA labels, keyboard navigation
- Performance: Memoize expensive calculations, lazy load routes
- Code Organization: Use absolute imports, consistent naming conventions
- Git Workflow: Commit often with meaningful messages
- Documentation: Comment complex logic, maintain updated README

Roadmap Summary & Next Steps

Congratulations on completing this 9-week Frontend Development Roadmap! You've built a comprehensive skill set that covers modern web development from fundamentals to advanced patterns. **What You've Learned:** • **Weeks 1-2:** HTML/CSS fundamentals, semantic markup, Flexbox/Grid layouts, and responsive design • **Weeks 3-4:** JavaScript essentials, DOM manipulation, async programming, and API integration • **Weeks 5-6:** React fundamentals, hooks, component patterns, and state management • **Week 7:** TypeScript for type-safe applications • **Week 8:** Tailwind CSS for rapid UI development • **Week 9:** Full-stack project bringing everything together **Skills Acquired:** ✓ Build responsive, accessible web applications ✓ Create complex UIs with React and modern JavaScript ✓ Implement type-safe code with TypeScript ✓ Style efficiently with Tailwind CSS ✓ Integrate with REST APIs and handle async operations ✓ Manage application state effectively ✓ Deploy production-ready applications **Next Steps:** 1. **Complete Your Project:** Build a portfolio-worthy application 2. **Learn More:** Explore Next.js, Redux Toolkit, React Query, or testing libraries 3. **Contribute:** Join open-source projects on GitHub 4. **Practice:** Build more projects to solidify your skills 5. **Share:** Deploy your work and get feedback from the community **Recommended Learning Paths:** • Next.js for full-stack React applications • Redux Toolkit for advanced state management • React Query/TanStack Query for server state • Jest and React Testing Library for testing • Web Performance optimization • Progressive Web Apps (PWAs) • Animation libraries (Framer Motion, React Spring) Remember: The best way to learn is by building. Take what you've learned and create something amazing. Every project makes you a better developer! Good luck on your frontend development journey! ■