Comprehensive CSS Scheme of Work

1. CSS Fundamentals

Syntax & Selectors

- Basic syntax (selector, property, value)
- Element selectors (p, div, h1)
- Class selectors (.classname)
- ID selectors (#idname)
- Universal selector (*)
- Attribute selectors ([type="text"], [href^="https"])
- Grouping selectors (h1, h2, h3)

Combinators

- Descendant combinator (space)
- Child combinator (>)
- Adjacent sibling combinator (+)
- General sibling combinator (~)

Pseudo-classes

- :hover, :active, :focus
- :first-child, :last-child, :nth-child()
- :not(), :is(), :where()
- :visited, :link
- :disabled, :enabled, :checked
- :first-of-type, :last-of-type, :nth-of-type()

Pseudo-elements

- ::before, ::after
- ::first-letter, ::first-line
- ::selection
- ::placeholder
- ::marker

Specificity & Cascade

- Specificity calculation (inline, IDs, classes, elements)

- Cascade rules
- Inheritance
- !important flag

2. Typography

Text Styling

- color
- font-family
- font-size (px, em, rem, %, vw, vh)
- font-weight (normal, bold, 100-900)
- font-style (normal, italic, oblique)
- font-variant (small-caps)
- line-height
- letter-spacing
- word-spacing

Text Decoration & Transformation

- text-decoration (underline, overline, line-through, none)
- text-decoration-color
- text-decoration-style (solid, double, dotted, dashed, wavy)
- text-decoration-thickness
- text-transform (uppercase, lowercase, capitalize)

Text Alignment & Layout

- text-align (left, right, center, justify)
- text-align-last
- vertical-align
- text-indent
- white-space (normal, nowrap, pre, pre-wrap, pre-line)
- word-wrap / overflow-wrap
- word-break
- text-overflow (clip, ellipsis)
- direction (ltr, rtl)
- writing-mode

Web Fonts

- @font-face
- font-display
- Google Fonts integration

- Variable fonts

3. Colors & Backgrounds

Color Values

- Named colors (red, blue, etc.)
- Hexadecimal (#RRGGBB, #RGB)
- RGB (rgb(255, 0, 0))
- RGBA (rgba(255, 0, 0, 0.5))
- HSL (hsl(0, 100%, 50%))
- HSLA (hsla(0, 100%, 50%, 0.5))
- currentColor keyword

Background Properties

- background-color
- background-image (url(), gradient)
- background-repeat (repeat, no-repeat, repeat-x, repeat-y)
- background-position (top, center, bottom, left, right, %)
- background-size (auto, cover, contain, px, %)
- background-attachment (scroll, fixed, local)
- background-origin
- background-clip
- background shorthand

Gradients

- linear-gradient()
- radial-gradient()
- conic-gradient()
- repeating-linear-gradient()
- repeating-radial-gradient()

Multiple Backgrounds

- Layering multiple background images
- Background blend modes

4. Box Model

Dimensions

- width, height
- min-width, max-width
- min-height, max-height
- box-sizing (content-box, border-box)

Spacing

- margin (top, right, bottom, left)
- margin shorthand
- margin: auto for centering
- margin collapsing
- padding (top, right, bottom, left)
- padding shorthand

Borders

- border-width
- border-style (solid, dashed, dotted, double, groove, ridge, inset, outset)
- border-color
- border shorthand
- border-radius (rounded corners)
- border-image
- Individual borders (border-top, border-right, etc.)

Outline

- outline-width
- outline-style
- outline-color
- outline-offset
- outline shorthand

5. Display & Positioning

Display Property

- display: block
- display: inline
- display: inline-block
- display: none
- display: flex
- display: grid
- display: table
- display: contents

- visibility: hidden vs display: none

Position Property

- position: static (default)
- position: relative
- position: absolute
- position: fixed
- position: sticky
- top, right, bottom, left
- z-index and stacking context

Float & Clear

- float (left, right, none)
- clear (left, right, both, none)
- clearfix technique

Overflow

- overflow (visible, hidden, scroll, auto)
- overflow-x, overflow-y
- text-overflow

6. Flexbox

Flex Container Properties

- display: flex / inline-flex
- flex-direction (row, row-reverse, column, column-reverse)
- flex-wrap (nowrap, wrap, wrap-reverse)
- flex-flow (shorthand)
- justify-content (flex-start, flex-end, center, space-between, space-around, space-evenly)
- align-items (flex-start, flex-end, center, stretch, baseline)
- align-content
- gap, row-gap, column-gap

Flex Item Properties

- flex-grow
- flex-shrink
- flex-basis
- flex (shorthand)
- align-self

- order

7. CSS Grid

Grid Container Properties

- display: grid / inline-grid
- grid-template-columns
- grid-template-rows
- grid-template-areas
- grid-template (shorthand)
- grid-column-gap / column-gap
- grid-row-gap / row-gap
- grid-gap / gap
- justify-items
- align-items
- justify-content
- align-content
- grid-auto-columns
- grid-auto-rows
- grid-auto-flow

Grid Item Properties

- grid-column-start, grid-column-end
- grid-column (shorthand)
- grid-row-start, grid-row-end
- grid-row (shorthand)
- grid-area
- justify-self
- align-self

Grid Functions

- repeat()
- minmax()
- fit-content()
- auto-fill, auto-fit
- fr unit

8. Responsive Design

Media Queries

- @media syntax
- Media types (screen, print, all)
- Media features:
  - width, min-width, max-width
  - height, min-height, max-height
  - orientation (portrait, landscape)
  - aspect-ratio
  - resolution
  - prefers-color-scheme (light, dark)
  - prefers-reduced-motion
- Logical operators (and, or, not)
- Mobile-first vs Desktop-first approach
- Common breakpoints

Responsive Units

- Absolute units (px, pt, cm, mm)
- Relative units (em, rem)
- Viewport units (vw, vh, vmin, vmax)
- Percentage (%)
- ch, ex units

Responsive Images

- max-width: 100%
- object-fit (fill, contain, cover, scale-down)
- object-position
- picture element integration
- srcset attribute

Container Queries

- @container
- container-type
- container-name

9. Transforms & Transitions

2D Transforms

- transform property
- translate(x, y) / translateX() / translateY()
- rotate()
- scale() / scaleX() / scaleY()

- skew() / skewX() / skewY()
- matrix()
- transform-origin

3D Transforms

- translate3d() / translateZ()
- rotate3d() / rotateX() / rotateY() / rotateZ()
- scale3d() / scaleZ()
- perspective
- perspective-origin
- transform-style (preserve-3d)
- backface-visibility

Transitions

- transition-property
- transition-duration
- transition-timing-function (ease, linear, ease-in, ease-out, ease-in-out, cubic-bezier)
- transition-delay
- transition shorthand

10. Animations

Keyframes

- @keyframes rule
- from / to
- Percentage keyframes (0%, 50%, 100%)

Animation Properties

- animation-name
- animation-duration
- animation-timing-function
- animation-delay
- animation-iteration-count (infinite, number)
- animation-direction (normal, reverse, alternate, alternate-reverse)
- animation-fill-mode (none, forwards, backwards, both)
- animation-play-state (running, paused)
- animation shorthand

11. Advanced Styling

Shadows

- box-shadow (x, y, blur, spread, color)
- text-shadow
- Multiple shadows
- drop-shadow() filter

Filters

- filter property
- blur()
- brightness()
- contrast()
- grayscale()
- hue-rotate()
- invert()
- opacity()
- saturate()
- sepia()
- drop-shadow()
- backdrop-filter

Blend Modes

- mix-blend-mode
- background-blend-mode
- Blend mode values (multiply, screen, overlay, etc.)

Clipping & Masking

- clip-path (circle(), ellipse(), polygon(), inset())
- mask-image
- mask-size
- mask-position

Opacity & Visibility

- opacity (0 to 1)
- visibility (visible, hidden, collapse)

12. Lists & Tables

Lists

- list-style-type (disc, circle, square, decimal, none)
- list-style-position (inside, outside)
- list-style-image
- list-style shorthand

Tables

- border-collapse (collapse, separate)
- border-spacing
- table-layout (auto, fixed)
- caption-side
- empty-cells

13. Multi-column Layout

Column Properties

- column-count
- column-width
- columns (shorthand)
- column-gap
- column-rule-width
- column-rule-style
- column-rule-color
- column-rule (shorthand)
- column-span
- column-fill

14. Custom Properties (CSS Variables)

Variables

- --custom-property-name
- var() function
- :root pseudo-class
- Scope and inheritance
- Fallback values
- calc() with variables

15. Advanced Selectors & Functions

Functions

- calc()
- min(), max(), clamp()
- attr()
- url()
- counter()
- var()

Advanced Techniques

- Custom properties (CSS variables)
- Feature queries (@supports)
- Import rules (@import)
- Charset declaration (@charset)
- CSS nesting (upcoming)

16. Modern CSS Features

Logical Properties

- margin-block, margin-inline
- padding-block, padding-inline
- border-block, border-inline
- inset-block, inset-inline

Aspect Ratio

- aspect-ratio property

Scroll Behavior

- scroll-behavior (smooth, auto)
- scroll-snap-type
- scroll-snap-align
- scroll-margin
- scroll-padding
- overscroll-behavior

CSS Grid Level 2

- subgrid

Color Functions

- color-mix()

- color-contrast()

17. Performance & Best Practices

Optimization

- CSS specificity management
- Avoiding !important
- Reducing selector complexity
- Critical CSS
- CSS containment (contain property)
- will-change property

Architecture

- BEM methodology
- OOCSS principles
- SMACSS architecture
- Utility-first CSS
- CSS Modules
- CSS-in-JS considerations

Vendor Prefixes

- -webkit-
- -moz-
- -ms-
- -o-
- Autoprefixer tools

18. Print Styles

Print-Specific CSS

- @media print
- page-break-before, page-break-after
- page-break-inside
- @page rule
- Hiding elements for print
- Print-friendly layouts

19. Accessibility

ARIA & CSS

- :focus-visible
- :focus-within
- outline management
- Contrast ratios
- Screen reader considerations
- prefers-reduced-motion
- prefers-contrast
- High contrast mode

20. Cross-Browser Compatibility

Compatibility Considerations

- Browser-specific issues
- Fallbacks for older browsers
- Progressive enhancement
- Graceful degradation
- CSS resets vs normalize.css
- Vendor prefixes
- Polyfills and postcss

Learning Path Recommendation

Beginner Level (Weeks 1-4)

- Sections 1-4: Fundamentals, Typography, Colors, Box Model

Intermediate Level (Weeks 5-10)

- Sections 5-8: Display/Positioning, Flexbox, Grid, Responsive Design

Advanced Level (Weeks 11-16)

- Sections 9-14: Transforms, Animations, Advanced Styling, Multi-column, Variables

Expert Level (Weeks 17-20)

- Sections 15-20: Modern features, Performance, Accessibility, Compatibility

Practice Projects

1. **Beginner**: Simple blog layout with typography
2. **Intermediate**: Responsive navigation menu
3. **Intermediate**: Photo gallery with Grid
4. **Advanced**: Animated landing page
5. **Advanced**: Dashboard with complex layouts
6. **Expert**: Component library with themes