Composable Vue

Pattens and tips for writing good composable logic in Vue

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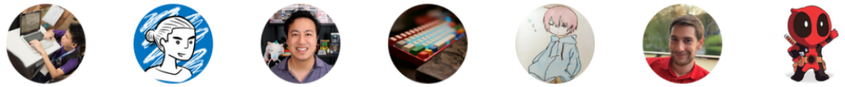

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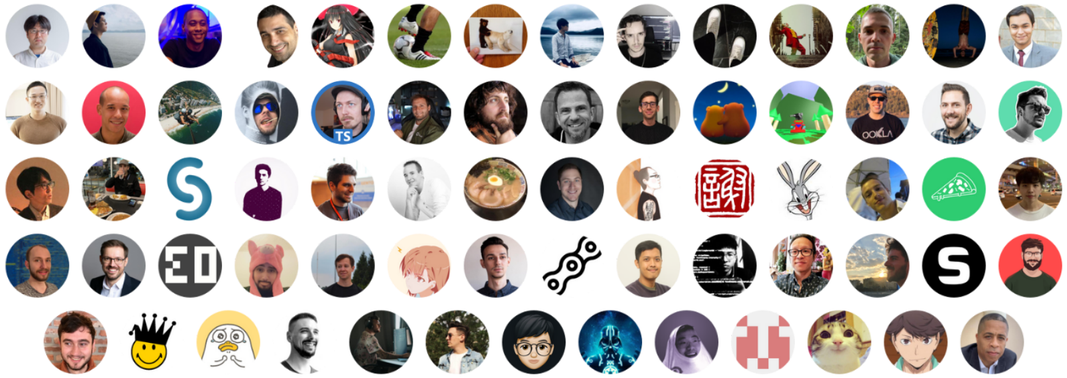

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Composable Vue

Collection of essential Vue Composition Utilities

v4.9.0 | 71k/month | docs & demos | 114 functions

Stars 3.8k

- Works for both Vue 2 and 3
- Tree-shakeable ESM
- CDN compatible
- TypeScript
- Rich ecosystems

Composition API

a brief go-through

Ref

```
import { ref } from 'vue'

let foo = 0
let bar = ref(0)

foo = 1
bar = 1 // ts-error
```

PROS

- More explicit, with type checking
- Less caveats

CONS

- `.value`

Reactive

```
import { reactive } from 'vue'

const foo = { prop: 0 }
const bar = reactive({ prop: 0 })

foo.prop = 1
bar.prop = 1
```

PROS

- Auto unwrapping (a.k.a `.value` free)

CONS

- Same as plain objects on types
- Destructure loses reactivity
- Need to use callback for `watch`

Ref Auto Unwrapping

Core

Get rid of `.value` for most of the time.

- `watch` accepts ref as the watch target, and returns the unwrapped value in the callback

```
const counter = ref(0)

watch(counter, count => {
  console.log(count) // same as `counter.value`
})
```

- Ref is auto unwrapped in the template

```
<template>
  <button @click="counter += 1">
    Counter is {{ counter }}
  </button>
</template>
```

- Reactive will auto-unwrap nested refs.

```
import { ref, reactive } from 'vue'
const foo = ref('bar')
const data = reactive({ foo, id: 10 })
data.foo // 'bar'
```

`unref` - Oppsite of Ref Core

- If it gets a Ref, returns the value of it.
- Otherwise, returns as-is.

IMPLEMENTATION

```
function unref<T>(r: Ref<T> | T): T {
  return isRef(r) ? r.value : r
}
```

USAGE

```
import { unref, ref } from 'vue'

const foo = ref('foo')
unref(foo) // 'foo'

const bar = 'bar'
unref(bar) // 'bar'
```

Patterns & Tips

of writing composable functions

What's Composable Functions

Sets of reusable logic, separation of concerns.

```
export function useDark(options: UseDarkOptions = {}) {
  const preferredDark = usePreferredDark()          // ⟵
  const store = useStorage('vueuse-dark', 'auto')  // ⟵

  return computed<boolean>({
    get() {
      return store.value === 'auto'
        ? preferredDark.value
        : store.value === 'dark'
    },
    set(v) {
      store.value = v === preferredDark.value
        ? 'auto' : v ? 'dark' : 'light'
    },
  })
}
```

Light

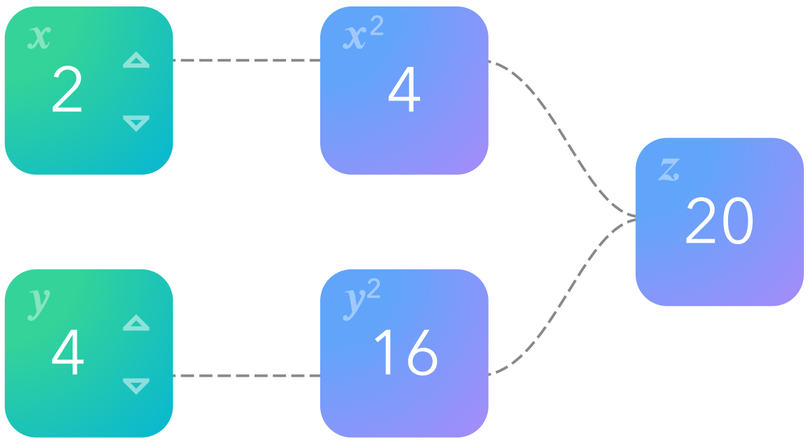
Avaliable in VueUse: `useDark`

Think as "Connections"

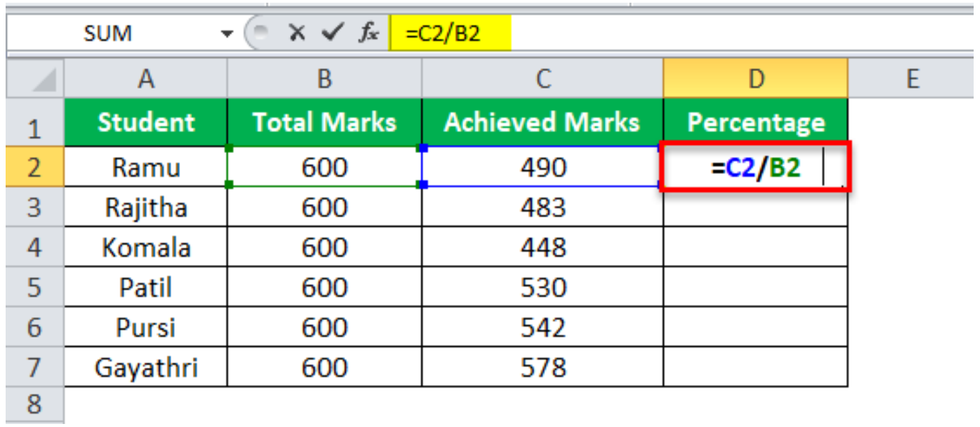
The `setup()` only runs **once** on component initialization, to construct the relations between your state and logic.

- Input → Output Effects
- Output reflects to input's changes automatically

$z=x^2+y^2$=2x2+4x4=20



SPREADSHEET FORMULA



	A	B	C	D	E
1	Student	Total Marks	Achieved Marks	Percentage	
2	Ramu	600	490	=C2/B2	
3	Rajitha	600	483		
4	Komala	600	448		
5	Patil	600	530		
6	Pursi	600	542		
7	Gayathri	600	578		
8					

One Thing at a Time

Just the same as authoring JavaScript functions.

- Extract duplicated logics into composable functions
- Have meaningful names
- Consistent naming conversions - `useXX` `createXX` `onXX`
- Keep function small and simple
- "Do one thing, and do it well"

Passing Refs as Arguments

Pattern

	IMPLEMENTATION	USAGE

Plain function	`function add(a: number, b: number) {`
	`  return a + b`
	`}`
		`let a = 1`
		`let b = 2`
		
		`let c = add(a, b) // 3`

Accpets refs, returns a reactive result.	`function add(a: Ref<number>, b: Ref<number>) {`
	`  return computed(() => a.value + b.value)`
	`}`
		`const a = ref(1)`
		`const b = ref(2)`
		
		`const c = add(a, b)`
		`c.value // 3`

Accpets both refs and plain values.	`function add(`
	`  a: Ref<number> | number,`
	`  b: Ref<number> | number`
	`) {`
	`  return computed(() => unref(a) + unref(b))`
	`}`
		`const a = ref(1)`
		
		`const c = add(a, 5)`
		`c.value // 6`

MaybeRef Tips

A custom type helper

```
type MaybeRef<T> = Ref<T> | T
```

In VueUse, we use this helper heavily to support optional reactive arguments

```
export function useTimeAgo(
  time: Date | number | string | Ref<Date | number | string>,
) {
  return computed(() => someFormating(unref(time)))
}
```

```
import { computed, unref, Ref } from 'vue'

type MaybeRef<T> = Ref<T> | T

export function useTimeAgo(
  time: MaybeRef<Date | number | string>,
) {
  return computed(() => someFormating(unref(time)))
}
```

Make it Flexible

Pattern

Make your functions like LEGO, can be used with different components in different ways.

CREATE A "SPECIAL" REF

```
import { useTitle } from '@vueuse/core'

const title = useTitle()

title.value = 'Hello World'
// now the page's title changed
```

BINDING AN EXISTING REF

```
import { ref, computed } from 'vue'
import { useTitle } from '@vueuse/core'

const name = ref('Hello')
const title = computed(() => {
  return `${name.value} - World`
})

useTitle(title) // Hello - World

name.value = 'Hi' // Hi - World
```

Avaliable in VueUse: `useTitle`

`useTitle` Case

Take a look at `useTitle`'s implementation

```
import { ref, watch } from 'vue'
import { MaybeRef } from '@vueuse/core'

export function useTitle(
  newTitle: MaybeRef<string | null | undefined>
) {
  const title = ref(newTitle || document.title)

  watch(title, (t) => {
    if (t != null)
      document.title = t
  }, { immediate: true })

  return title
}
```

```
⟵ 1. use the user provided ref or create a new one

⟵ 2. sync ref changes to the document title
```

"Reuse" Ref `Core`

If you pass a `ref` into `ref()`, it will return the original ref as-is.

```
const foo = ref(1)   // Ref<1>
const bar = ref(foo) // Ref<1>

foo === bar // true
```

```
function useFoo(foo: Ref<string> | string) {
  // no need!
  const bar = isRef(foo) ? foo : ref(foo)

  // they are the same
  const bar = ref(foo)

  /* ... */
}
```

Extremely useful in composable functions that take uncertain argument types.

`ref` / `unref` Tips

- `MaybeRef<T>` works well with `ref` and `unref`.
- Use `ref()` when you want to normalized it as a Ref.
- Use `unref()` when you want to have the value.

```
type MaybeRef<T> = Ref<T> | T

function useBala<T>(arg: MaybeRef<T>) {
  const reference = ref(arg) // get the ref
  const value = unref(arg)   // get the value
}
```

Object of Refs `Pattern`

Getting benefits from both `ref` and `reactive` for authoring composable functions

```
import { ref, reactive } from 'vue'

function useMouse() {
  return {
    x: ref(0),
    y: ref(0)
  }
}

const { x, y } = useMouse()
const mouse = reactive(useMouse())

mouse.x === x.value // true
```

- Destructurable as Ref
- Convert to reactive object to get the auto-unwrapping when needed

Async to "Sync" Tips

With Composition API, we can actually turn async data into "sync"

ASYNC

```
const data = await fetch('https://api.github.com/').then(r => r.json())

// use data
```

COMPOSITION API

```
const { data } = useFetch('https://api.github.com/').json()

const user_url = computed(() => data.value?.user_url)
```

Establish the "Connections" first, then wait data to be filled up. The idea is similar to SWR (stale-while-revalidate)

`useFetch`

Case

```
export function useFetch<R>(url: MaybeRef<string>) {
  const data = shallowRef<T | undefined>()
  const error = shallowRef<Error | undefined>()

  fetch(unref(url))
    .then(r => r.json())
    .then(r => data.value = r)
    .catch(e => error.value = e)

  return {
    data,
    error
  }
}
```

Avaliable in VueUse: useFetch

Side-effects Self Cleanup `Pattern`

The `watch` and `computed` will stop themselves on components unmounted.
We'd recommend following the same pattern for your custom composable functions.

```
import { onUnmounted } from 'vue'

export function useEventListener(target: EventTarget, name: string, fn: any) {
  target.addEventListener(name, fn)

  onUnmounted(() => {
    target.removeEventListener(name, fn) // ←
  })
}
```

Avaliable in VueUse: `useEventListener`

`effectScope` RFC Upcoming

A new API to collect the side effects automatically. Likely to be shipped with Vue 3.1
https://github.com/vuejs/rfcs/pull/212

```
// effect, computed, watch, watchEffect created inside the scope will be collected

const scope = effectScope(() => {
  const doubled = computed(() => counter.value * 2)

  watch(doubled, () => console.log(double.value))

  watchEffect(() => console.log('Count: ', double.value))
})

// dispose all effects in the scope
stop(scope)
```

Typed Provide / Inject `Core`

Use the `InjectionKey<T>` helper from Vue to share types across context.

```
// context.ts
import { InjectionKey } from 'vue'

export interface UserInfo {
  id: number
  name: string
}

export const injectKeyUser: InjectionKey<UserInfo> = Symbol()
```

Typed Provide / Inject

Core

Import the key from the same module for `provide` and `inject`.

```vue
// parent.vue
import { provide } from 'vue'
import { injectKeyUser } from './context'

export default {
  setup() {
    provide(injectKeyUser, {
      id: '7', // type error: should be number
      name: 'Anthony'
    })
  }
}
```

```vue
// child.vue
import { inject } from 'vue'
import { injectKeyUser } from './context'

export default {
  setup() {
    const user = inject(injectKeyUser)
    // UserInfo | undefined

    if (user)
      console.log(user.name) // Anthony
  }
}
```

Shared State

Pattern

By the nature of Composition API, states can be created and used independently.

```
// shared.ts
import { reactive } from 'vue'

export const state = reactive({
  foo: 1,
  bar: 'Hello'
})
```

```
// A.vue
import { state } from './shared.ts'

state.foo += 1
```

```
// B.vue
import { state } from './shared.ts'

console.log(state.foo) // 2
```

⚠ BUT IT'S NOT SSR COMPATIBLE!

Shared State (SSR friendly) `Pattern`

Use `provide` and `inject` to share the app-level state

```
export const myStateKey: InjectionKey<MyState> = Symbol()

export function createMyState() {
  const state = {
    /* ... */
  }

  return {
    install(app: App) {
      app.provide(myStateKey, state)
    }
  }
}

export function useMyState(): MyState {
  return inject(myStateKey)!
}
```

```
// main.ts
const App = createApp(App)

app.use(createMyState())
```

```
// A.vue

// use everywhere in your app
const state = useMyState()
```

- Vue Router v4 is using the similar approach

useVModel

Tips

A helper to make props/emit easier

```
export function useVModel(props, name) {
  const emit = getCurrentInstance().emit

  return computed({
    get() {
      return props[name]
    },
    set(v) {
      emit(`update:${name}`, v)
    }
  })
}
```

```
export default defineComponent({
  setup(props) {
    const value = useVModel(props, 'value')

    return { value }
  }
})
```

```
<template>
  <input v-model="value" />
</template>
```

Avaliable in VueUse: `useVModel`

All of them work for both Vue 2 and 3

`@vue/composition-api` Lib

Composition API support for Vue 2.

vuejs/composition-api

```
import Vue from 'vue'
import VueCompositionAPI from '@vue/composition-api'

Vue.use(VueCompositionAPI)
```

```
import { ref, reactive } from '@vue/composition-api'
```

Vue 2.7 `Upcoming`

Plans in Vue 2.7

- Backport `@vue/composition-api` into Vue 2's core.
- `<script setup>` syntax in Single-File Components.
- Migrate codebase to TypeScript.
- IE11 support.
- LTS.

Vue Demi

Lib

Creates Universal Library for Vue 2 & 3

vueuse/vue-demi

```
// same syntax for both Vue 2 and 3
import { ref, reactive, defineComponent } from 'vue-demi'
```

23 VueDemi

Creates Universal Library for Vue 2 & 3

Recap

- Think as "Connections"
- One thing as a time
- Accepting ref as arguments
- Returns an object of refs
- Make functions flexible
- Async to "sync"
- Side-effect self clean up
- Shared state

Thank You!

Slides can be found on antfu.me