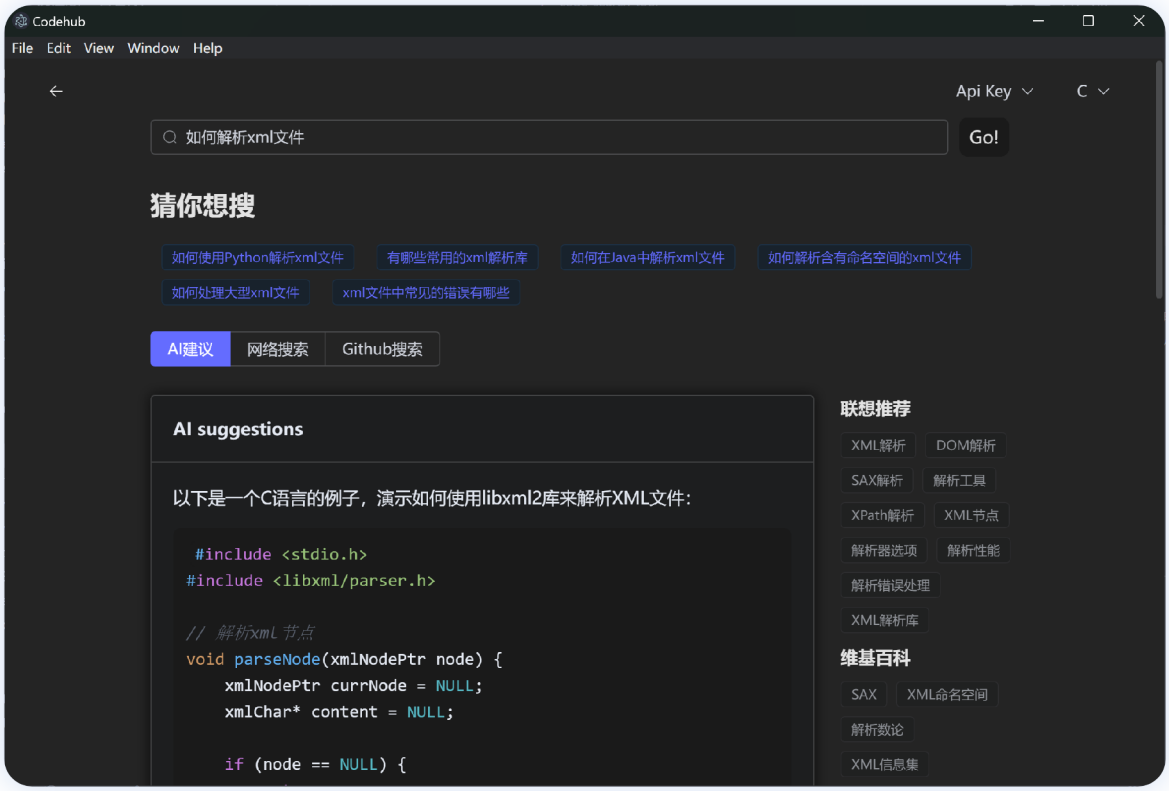
# Codehub应用文档



## Codehub简介

`Codehub` 是一款跨平台帮助编程初学者学习代码的软件，他集成了 `Ai` ， `Web搜索` ， `github` , `wikipedia` 以及 `Stackoverflow` 等多方面的信息来源来帮助初学者给出相应的代码样例与相关教程。

- 主要界面




## 应用架构

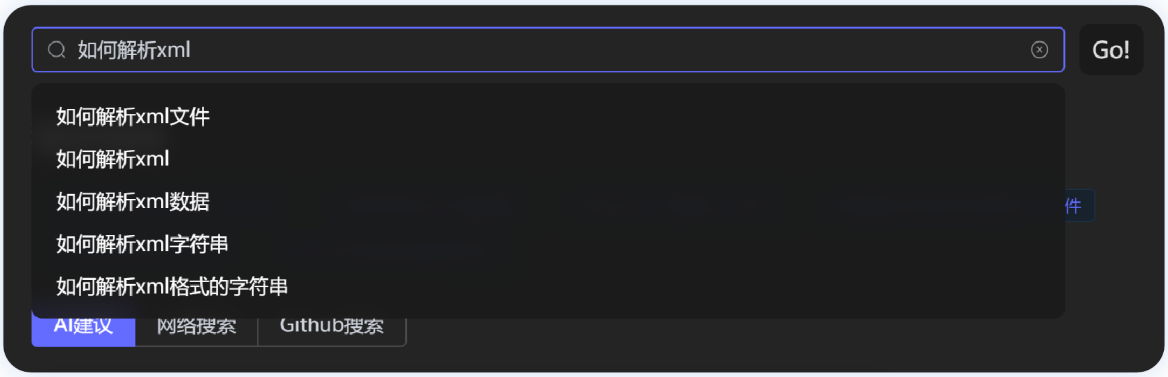
`Codehub` 采用 `electron` 与 `Vue` 实现， `electron` 是一个基于 `nodejs` 的跨平台桌面应用开发框架，他可以让我们使用 `html` , `css` , `js` , `Vue.js` 等前端技术来开发桌面应用。 `Vue` 是一个轻量级的前端框架，他可以让我们更加方便的开发前端应用。

## 应用功能

`Codehub` 的主要功能有：问题搜索，Ai代码建议，问题联想，关键词联想，Wiki百科介绍，Web搜索，github仓库搜索，Stackoverflow文章推荐。

- **问题搜索**

  用户可以在搜索框中键入想要了解的编程问题，同时搜索框会给出问题建议，帮助用户更快捷的搜索。




- **Ai代码建议**

  用户可以得到来自Ai对于所搜索问题的相关建议与回答，一般包含若干个代码示例，与相应的代码解释。


- **问题联想**

  用户输入问题后，软件会根据用户所输入的问题进行问题联想，给用户更多的搜索建议


- **关键词联想**

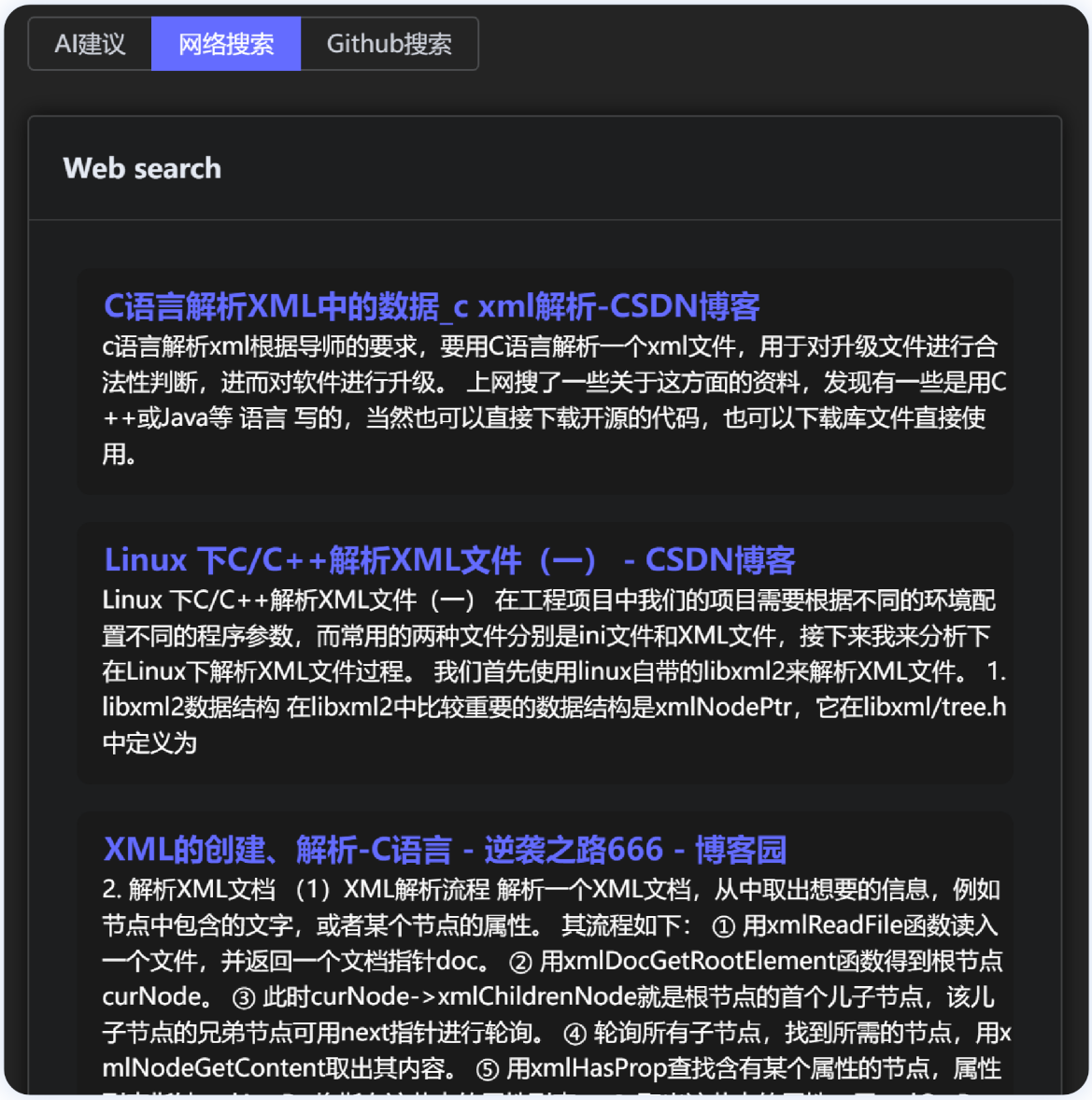
  用户输入问题后，软件会根据用户所输入的问题进行关键词提取与联想，给出解决用户问题中可能会需要用到的一些关键知识点，点击对应关键词会直接在浏览器中对该关键词进行搜索。


- **Wiki百科介绍**

  Wiki百科介绍会根据用户的问题，直接给出可能用到的知识的百科链接，点击后会直接进入到百科页面。

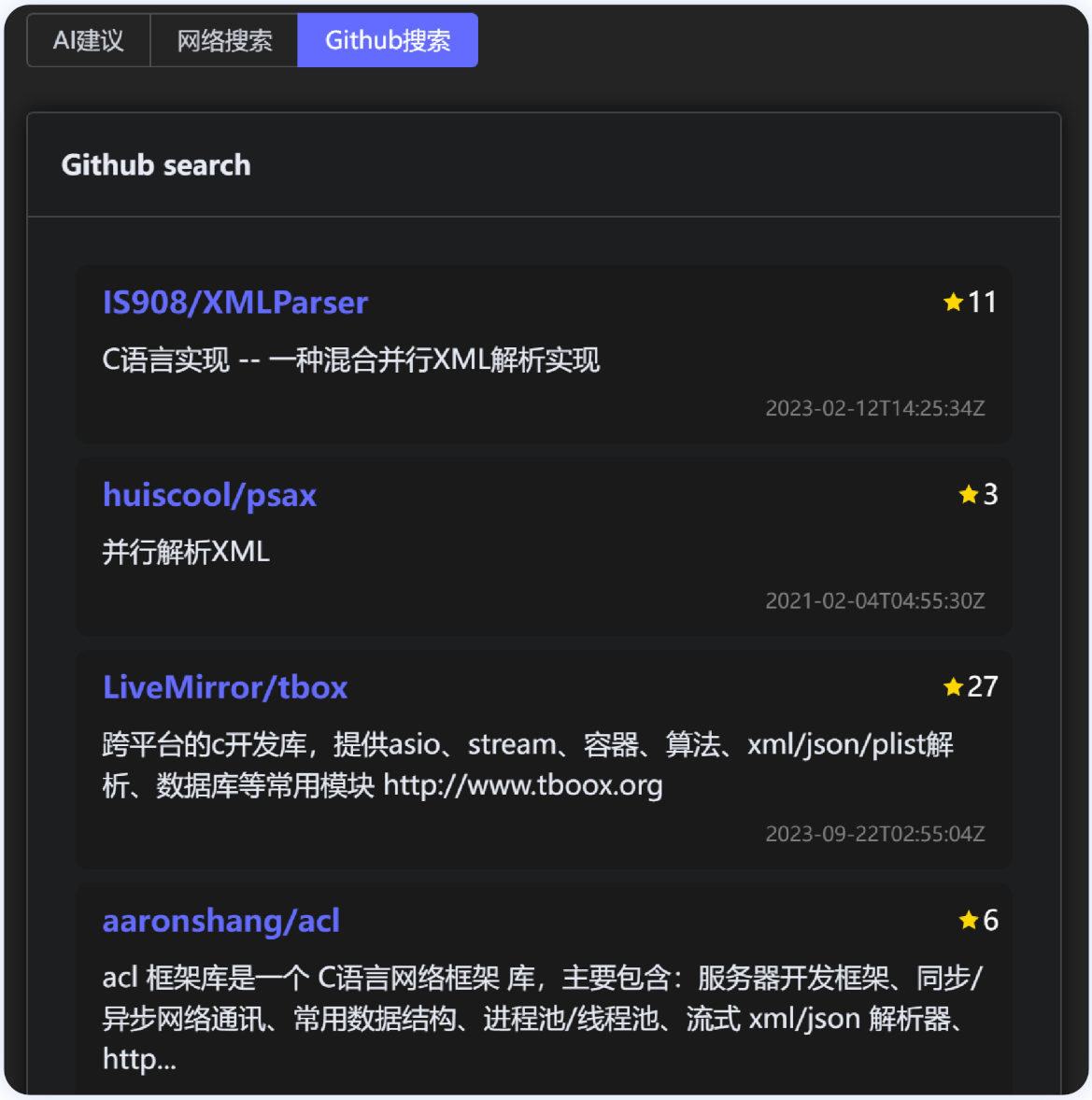

- **Web搜索**

  软件会根据用户输入的问题直接在网络上进行相关搜索，给出相应的链接，点击后会跳转到对应的链接页面。



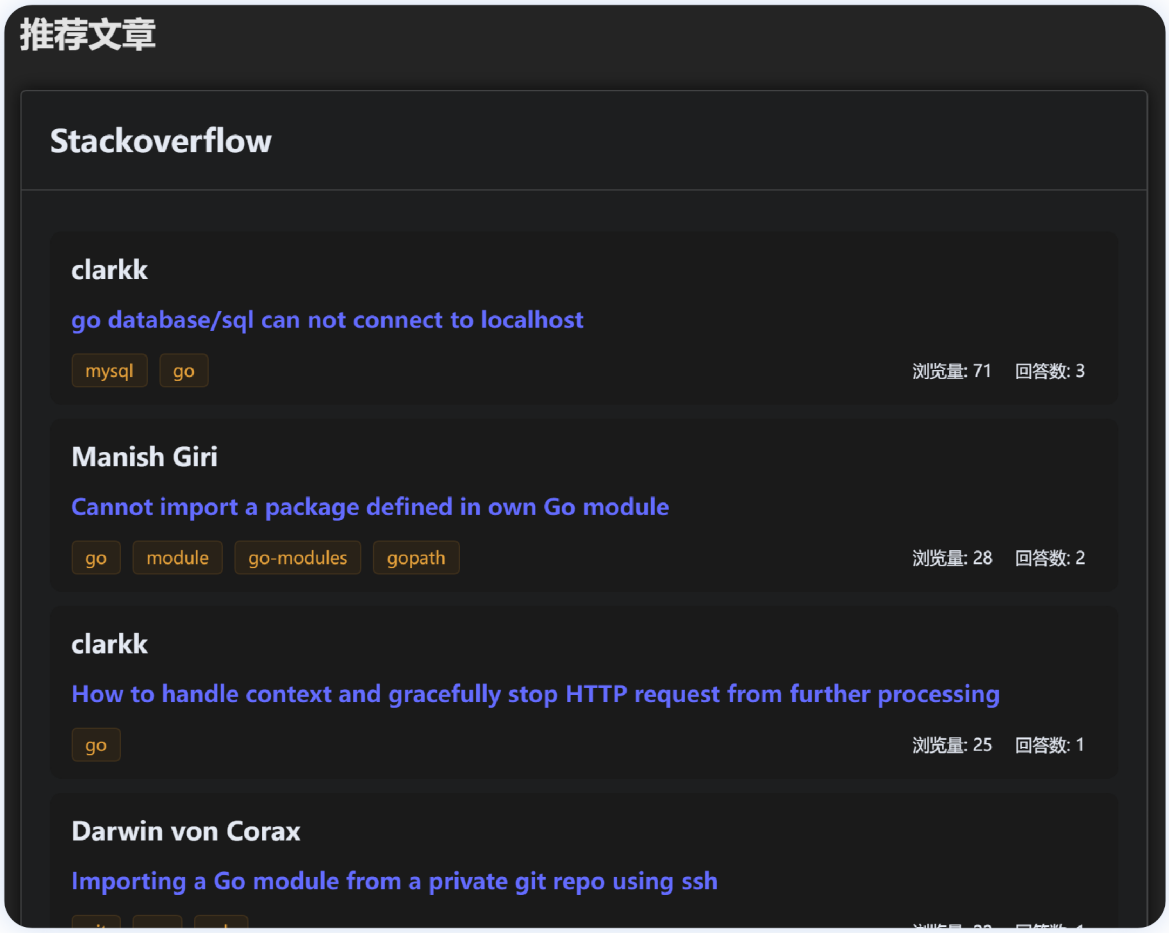

- **github仓库搜索**

  软件还会根据用户的问题，在github的仓库中搜索相关内容，点击链接后会跳转到对应的仓库界面。




- **Stackoverflow文章推荐**

  进入软件界面，软件会随机推荐Stackoverflow上的热点问题，并列出其问题涉及的相关方面，点击问题界面后，会进入到问题详情。




## 功能实现

### 界面实现

界面使用 `Vue` 实现，主要使用了 `element-plus` 组件库与 `tailwind css`，`element-plus` 组件库提供了美观的组件，`tailwind css` 提供了使用原子类来代替传统 `css` 的开发，通过这些技术，可以方便快捷地开发出美观的界面。以下是部分界面代码：

```
<script setup lang="ts">
import{Ref} from 'vue'
definePropss({
    questions: {
        type: Array<String>,
        required: true
    },
})

const emit = defineEmits(['select'])
const handleSelect = (ques: string) => {
    emit('select', ques)
}
```

```
</script>

<template>
    <div class="flex flex-col w-full justify-center items-center mb-2">
        <div class="w-full flex justify-start items-center flex-wrap">
            <el-tag v-for="(ques,index) in questions" :key="index" class="mx-2.5 my-1" @click="handleSelect(ques.toString())">{{ ques }}</el-tag>
        </div>
    </div>
</template>

<style scoped>
.el-tag {
    cursor: pointer;
}
</style>
```

## API调用

`Codehub` 总共使用了来自gpt，bing，github，mediawiki，StackExchange五个来源的api，各个api的调用实现如下：

### gpt

#### 正常传输

- `json schema`

```
{
    "id": "chatcmpl-8CPEoTKCVzwF0tZ2d0O8izSNQZfXP",
    "object": "chat.completion",
    "created": 1697967642,
    "model": "gpt-3.5-turbo-0613",
    "choices": [
        {
            "index": 0,
            "message": {
                "role": "assistant",
                "content": "{如何定义一个函数？}\n\n{什么是递归函数？如何实现递归函数？}\n\n{什么是面向对象编程？如何定义一个类？}\n\n{如何判断两个变量是否相等？}\n\n{如何调试代码？有哪些常用的调试方法？}\n\n{什么是异常处理？如何在代码中进行异常处理？}"
            },
            "finish_reason": "stop"
        }
```

```
    ],
    "usage": {
        "prompt_tokens": 57,
        "completion_tokens": 99,
        "total_tokens": 156
    },
    "code": 0,
    "msg": "ok"
}
```

- 代码示例

```
import axios from 'axios'

export const getGptResponse = (params:any,key:string) => {
    return axios({
        method:'post',

 url:'http://flag.smarttrot.com/index.php/api/v1/chat/completions',
        data:params,
        headers:{
            'Content-Type':'application/json',
            'Authorization':'Bearer '+key
        }
    }).then(res=>{
        if(res.status===200&&res.data){
            if(res.data.msg==='ok'){

 if(res.data.choices[0].finish_reason==='stop'&&res.data.choices[0].mess
age){
                    return res.data.choices[0].message.content
                }
            }else{
                return 'api error '+res.data.msg
            }
        }else{
            return 'network error'
        }
      }
    )
}
```

### 流式传输

由于gpt生成完整回答的时间过长，用户使用体验并不好，因此api还提供了流式传输的选项，可以实现gpt一边生成，一边传给客户端响应。使用流式传输需要在调用参数中指定 `stream: true` 选项，接口会将结果作为EventStream的一系列事件（event）返回,例如：

```
async fetch(messages: GptMsgs) {
    return await fetch('http://flag.smarttrot.com/index.php/api/v1/chat/completions', {
      method: 'POST',
      body: JSON.stringify({
        model: 'gpt-3.5-turbo',
        messages,
        stream: true
      }),
      headers: {
        'Content-Type': 'application/json',
        Authorization: `Bearer ${this.key}`
      }
    })
  }
```

同时发起请求后，需要从response中通过 `getReader` 方法获取 `reader` ，同时通过通过while循环 + `reader.read()` 获取每次传输的数据，每次获取的数据格式为 `Uint8Array` ，通过浏览器原生支持的 `TextDecoder` 将buffer解析成字符串，再通过正则表达式匹配其中的 `json` 数据

```
const parsePack = (str: string) => {
    // 定义正则表达式匹配模式
    const pattern = /data:\s*({.*?})\s*\n/g
    // 定义一个数组来存储所有匹 配到的 JSON 对象
    const result = []
    // 使用正则表达式匹配完整的 JSON 对象并解析它们
    let match
    while ((match = pattern.exec(str)) !== null) {
        const jsonStr = match[1]
        try {
        const json = JSON.parse(jsonStr)
        result.push(json)
        } catch (e) {
        console.log(e)
        }
    }
    // 输出所有解析出的 JSON 对象
    return result
```

```
}
```

最后获得gpt的回答。

```
async stream(prompt: string, history: GptMsgs = []) {
    let finish = false
    let count = 0
    // 触发onStart
    this.onStart(prompt)
    // 发起请求
    const res = await this.fetch([...history, { 'role': 'user', content:
prompt }])
    if (!res.body) return
    // 从response中获取reader
    const reader = res.body.getReader()
    const decoder: TextDecoder = new TextDecoder()
    // 循环读取内容
    while (!finish) {
      const { done, value } = await reader.read()
      // console.log(value)
      if (done) {
        finish = true
        this.onDone()
        break
      }
      count++
      const jsonArray = parsePack(decoder.decode(value))
      if (count === 1) {
        this.onCreated()
      }
      jsonArray.forEach((json: any) => {
        if (!json.choices || json.choices.length === 0) {
          return
        }
        const text = json.choices[0].delta.content
        this.onPatch(text)
      })
    }
  }
```

## bing

### web search

通过直接使用bing的`web search` api，得到有关网页的内容，并排列表示出来

- `json schema`


```
{
    "_type": "SearchResponse",
    "queryContext": {
        "originalQuery": "如何定义一个函数？ C"
    },
    "webPages": {
        "webSearchUrl": "https:\/\/www.bing.com\/search?q=%E5%A6%82%E4%BD%95%E5%AE%9A%E4%B9%89%E4%B8%80%E4%B8%AA%E5%87%BD%E6%95%B0%EF%BC%9F+C",
        "totalEstimatedMatches": 56500000,
        "value": [
            {
                "id": "https:\/\/api.bing.microsoft.com\/api\/v7\/#WebPages.0",
                "name": "C语言函数定义（C语言自定义函数） - C语言中文网",
                "url": "http:\/\/c.biancheng.net\/view\/1851.html",
                "isFamilyFriendly": true,
                "displayUrl": "c.biancheng.net\/view\/1851.html",
                "snippet": "C语言函数定义（C语言自定义函数）. 函数是一段可以重复使用的代码，用来独立地完成某个功能，它可以接收用户传递的数据，也可以不接收。. 接收用户数据的函数在定义时要指明参数，不接收用户数据的不需要指明，根据这一点可以将函数分为有参函数和无 ...",
                "deepLinks": [
                    {
                        "name": "C语言枚举类型",
                        "url": "http:\/\/c.biancheng.net\/view\/2034.html",
                        "snippet": "C语言枚举类型（C语言enum用法）详解 在实际编程中，有些数据的取值往往是有限的，只能是非常少量的整数，并且最好为每个值都取一个名字，以方便在后续代码中使用，比如一个星期只有七天，一年只有十二个月，一个班每周有六门课程等。",
                        "deepLinks": []
                    },
                    {
                        "name": "什么是函数",
                        "url": "http:\/\/c.biancheng.net\/view\/1850.html",
```

```
                            "snippet": "C语言自带的函数称为 库函数（Library Function）。库（Library） 是编程中的一个基本概念，可以简单地认为它是一系列函数的集合，在磁盘上往往是一个文件夹。C语言自带的库称为 标准库（Standard Library），其他公司或个人开发的库称为 第三方库（Third。",
                            "deepLinks": []
                        },
                        {
                            "name": "函数声明以及函数原型",
                            "url": "http:\/\/c.biancheng.net\/view\/1857.html",
                            "snippet": "学完《C语言多文件编程》，你对C语言的认识将会有质的提升，瞬间豁然开朗，轻松超越 90% 的C语言程序员。 函数参考手册 最后再补充一点，函数原型给出了使用该函数的所有细节，当我们不知道如何使用某个函数时，需要查找的是它的原型，而不是它的定义，我们往往不关心它的实现。",
                            "deepLinks": []
                        },
                        {
                            "name": "带实例演示",
                            "url": "http:\/\/c.biancheng.net\/view\/1861.html",
                            "snippet": "C语言递归函数（递归调用）详解[带实例演示]一个函数在它的函数体内调用它自身称为 递归调用 ，这种函数称为 递归函数 。 执行递归函数将反复调用其自身，每调用一次就进入新的一层，当最内层的函数执行完毕后，再一层一层地由里到外退出。",
                            "deepLinks": []
                        },
                        {
                            "name": "指针",
                            "url": "http:\/\/c.biancheng.net\/c\/80\/",
                            "snippet": "C语言指针是什么？1分钟彻底理解C语言指针的概念 2. C语言指针变量的定义和使用（精华） 3. C语言指针变量的运算（加法、减法和比较运算） 4. C语言数组指针（指向数组的指针）详解 5. C语言字符串指针（指向字符串的指针）详解 6. C语言数组灵活多变的"
                        },
                        {
                            "name": "循环结构和选择结构",
                            "url": "http:\/\/c.biancheng.net\/c\/32\/",
                            "snippet": "C语言顺序结构就是让程序按照从头到尾的顺序依次执行每一条C语言代码，不重复执行任何代码，也不跳过任何代码。 C语言选择结构也称分支结构，就是让程序“拐弯”，有选择性的执行代码；换句话说，可以跳过没用的代码，只执行有用的代码。",
                            "deepLinks": []
                        }
                    ],
                    "dateLastCrawled": "2023-10-16T04:59:00.0000000Z",
                    "language": "zh_chs",
```

```
                "isNavigational": true
            },
            {
                "id":
"https:\/\/api.bing.microsoft.com\/api\/v7\/#WebPages.2",
                "name": "C语言基础：函数的声明与定义 - 知乎 - 知乎专栏",
                "url": "https:\/\/zhuanlan.zhihu.com\/p\/33885407",
                "isFamilyFriendly": true,
                "displayUrl":
"https:\/\/zhuanlan.zhihu.com\/p\/33885407",
                "snippet": "函数的声明就是告诉编译器我们想要定义一个函数，并明
确规定其返回值（输出）、函数名、参数表（输入）。. 声明函数的语法如下：. type
function_name (type var); 下面我们来看几个声明函数的例子：. int max (int a,
int b); \/\/返回两个变量中值较大的值。. float sum (float ...",
                "dateLastCrawled": "2023-10-19T19:35:00.0000000Z",
                "language": "zh_chs",
                "isNavigational": false
            },
            {
                "id":
"https:\/\/api.bing.microsoft.com\/api\/v7\/#WebPages.3",
                "name": "C语言函数的定义 - C语言教程 - C语言网",
                "url": "https:\/\/www.dotcpp.com\/course\/25",
                "isFamilyFriendly": true,
                "displayUrl": "https:\/\/www.dotcpp.com\/course\/25",
                "snippet": "C语言函数的定义. C源程序是由 函数 组成的。. 最简单
的程序有一个主函数main (), 但实用程序往往由多个函数组成，由主函数调用其他函数，其他
函数也可以互相调用。. 函数 是C源程序的基本模块，程序的许多功能是通过对函数模块的调用
来实现的，学会编写和 ...",
                "dateLastCrawled": "2023-10-20T06:24:00.0000000Z",
                "language": "zh_chs",
                "isNavigational": false
            },
            {
                "id":
"https:\/\/api.bing.microsoft.com\/api\/v7\/#WebPages.4",
                "name": "C语言函数详解（包括声明、定义、使用等）",
                "url": "http:\/\/c.biancheng.net\/c\/71\/",
                "isFamilyFriendly": true,
                "displayUrl": "c.biancheng.net\/c\/71",
                "snippet": "C语言函数的概念 2. C语言函数定义（C语言自定义函
数） 3. C语言形参和实参的区别（非常详细） 4. C语言return的用法详解，C语言函数返回
值详解 5. C语言函数调用详解（从中发现程序运行的秘密） 6. C语言函数声明以及函数原型
7. C语言全局变量和局部变量（带 ...",
                "dateLastCrawled": "2023-10-16T10:21:00.0000000Z",
                "language": "zh_chs",
```

```
                "isNavigational": false
            },
            {
                "id":
"https:\/\/api.bing.microsoft.com\/api\/v7\/#WebPages.5",
                "name": "C 语言函数详解 - 知乎",
                "url": "https:\/\/zhuanlan.zhihu.com\/p\/610310388",
                "isFamilyFriendly": true,
                "displayUrl":
"https:\/\/zhuanlan.zhihu.com\/p\/610310388",
                "snippet": "C 语言函数详解. 函数是 C 语言中的重要组成部分，它可以将程序分解为模块，提高代码的可读性和可维护性。. 函数由函数头和函数体组成，函数头包括函数名、返回值类型和参数列表，函数体包括函数执行的语句块。. 本文将详细介绍 C 语言中的函数，包括 ...",
                "dateLastCrawled": "2023-10-17T15:59:00.0000000Z",
                "language": "zh_chs",
                "isNavigational": false
            }
        ]
    },
    "relatedSearches": {
        "id":
"https:\/\/api.bing.microsoft.com\/api\/v7\/#RelatedSearches",
        "value": [
            {
                "text": "c 定义一个函数指针",
                "displayText": "c 定义一个函数指针",
                "webSearchUrl": "https:\/\/www.bing.com\/search?
q=c+%E5%AE%9A%E4%B9%89%E4%B8%80%E4%B8%AA%E5%87%BD%E6%95%B0%E6%8C%87%E9%92%88"
            },
            {
                "text": "c语言怎么自定义一个函数",
                "displayText": "c语言怎么自定义一个函数",
                "webSearchUrl": "https:\/\/www.bing.com\/search?
q=c%E8%AF%AD%E8%A8%80%E6%80%8E%E4%B9%88%E8%87%AA%E5%AE%9A%E4%B9%89%E4%B8%80%E4%B8%AA%E5%87%BD%E6%95%B0"
            },
            {
                "text": "c语言自定义输入函数",
                "displayText": "c语言自定义输入函数",
                "webSearchUrl": "https:\/\/www.bing.com\/search?
q=c%E8%AF%AD%E8%A8%80%E8%87%AA%E5%AE%9A%E4%B9%89%E8%BE%93%E5%85%A5%E5%87%BD%E6%95%B0"
            },
        ]
```

```
    },
    "rankingResponse": {
        "mainline": {
            "items": [
                {
                    "answerType": "WebPages",
                    "resultIndex": 0,
                    "value": {
                        "id":
"https:\/\/api.bing.microsoft.com\/api\/v7\/#WebPages.0"
                    }
                },
                {
                    "answerType": "WebPages",
                    "resultIndex": 1,
                    "value": {
                        "id":
"https:\/\/api.bing.microsoft.com\/api\/v7\/#WebPages.1"
                    }
                },
                {
                    "answerType": "WebPages",
                    "resultIndex": 2,
                    "value": {
                        "id":
"https:\/\/api.bing.microsoft.com\/api\/v7\/#WebPages.2"
                    }
                },
                {
                    "answerType": "WebPages",
                    "resultIndex": 3,
                    "value": {
                        "id":
"https:\/\/api.bing.microsoft.com\/api\/v7\/#WebPages.3"
                    }
                },
                {
                    "answerType": "WebPages",
                    "resultIndex": 4,
                    "value": {
                        "id":
"https:\/\/api.bing.microsoft.com\/api\/v7\/#WebPages.4"
                    }
                },
                {
                    "answerType": "WebPages",
```

```
                    "resultIndex": 5,
                    "value": {
                        "id":
    "https:\/\/api.bing.microsoft.com\/api\/v7\/#WebPages.5"
                    }
                },
                {
                    "answerType": "WebPages",
                    "resultIndex": 6,
                    "value": {
                        "id":
    "https:\/\/api.bing.microsoft.com\/api\/v7\/#WebPages.6"
                    }
                },
                {
                    "answerType": "WebPages",
                    "resultIndex": 7,
                    "value": {
                        "id":
    "https:\/\/api.bing.microsoft.com\/api\/v7\/#WebPages.7"
                    }
                },
                {
                    "answerType": "WebPages",
                    "resultIndex": 8,
                    "value": {
                        "id":
    "https:\/\/api.bing.microsoft.com\/api\/v7\/#WebPages.8"
                    }
                },
                {
                    "answerType": "RelatedSearches",
                    "value": {
                        "id":
    "https:\/\/api.bing.microsoft.com\/api\/v7\/#RelatedSearches"
                    }
                }
            ]
        }
    }
}
```


- `api调用代码`

分页调用，传入pagesize与page

```
import axios from "axios"
```

```
export const bingWebSearch=(query:any,page:number,pagesize:number,SUBSCRIPTION_KEY:string)=>{
  return axios({
    method:'get',
    url:'https://api.bing.microsoft.com/v7.0/search?q='+encodeURIComponent(query)+`&page=${page}&pagesize=${pagesize}`,
    headers:{
      'Ocp-Apim-Subscription-Key':SUBSCRIPTION_KEY
    }
  }).then(res=>{
    if(res.status===200&&res.data){
      let pages = res.data.webPages.value.map((page:any)=>{
        return {
          url:page.url,
          snippet:page.snippet,
          name:page.name
        }
      })
      return pages
    }else if(res.status===403){
      return []
    }else{
      return []
    }
  })
}

export const bingWebSearchSize=(query:any,SUBSCRIPTION_KEY:string)=>{
  return axios({
    method:'get',
    url:'https://api.bing.microsoft.com/v7.0/search?q='+encodeURIComponent(query),
    headers:{
      'Ocp-Apim-Subscription-Key':SUBSCRIPTION_KEY
    }
  }).then(res=>{
    if(res.status===200&&res.data){
      return res.data.webPages.totalEstimatedMatches
    }else{
      return -1
    }
  })
}
```

### 搜索建议

搜索建议用于在用户输入问题时，实时根据问题的内容给出候选内容

- `json schema`

```
{
    "_type": "Suggestions",
    "queryContext": {
        "originalQuery": "如何定义一个函数? "
    },
    "suggestionGroups": [
        {
            "name": "Web",
            "searchSuggestions": [
                {
                    "url": "https:\/\/www.bing.com\/search?q=%E5%A6%82%E4%BD%95%E5%AE%9A%E4%B9%89%E4%B8%80%E4%B8%AA%E5%87%BD%E6%95%B0matlab&FORM=USBAPI",
                    "displayText": "如何定义一个函数matlab",
                    "query": "如何定义一个函数matlab",
                    "searchKind": "WebSearch"
                },
                {
                    "url": "https:\/\/www.bing.com\/search?q=%E5%A6%82%E4%BD%95%E5%AE%9A%E4%B9%89%E4%B8%80%E4%B8%AA%E5%87%BD%E6%95%B0python&FORM=USBAPI",
                    "displayText": "如何定义一个函数python",
                    "query": "如何定义一个函数python",
                    "searchKind": "WebSearch"
                }
            ]
        }
    ]
}
```

- `api调用代码`

```
export const bingAutoSuggest = async (query: string): Promise<string[]> => {
  return axios({
    method: 'get',
    url: `https://api.bing.microsoft.com/v7.0/suggestions?q=${encodeURIComponent(query)}`,
    headers: {
```

```
      'Ocp-Apim-Subscription-Key': SUBSCRIPTION_KEY,
    },
  }).then((res) => {
    if (res.status === 200 && res.data && res.data.suggestionGroups) {
      const suggestions =
res.data.suggestionGroups[0].searchSuggestions.map((suggestion: any) =>
suggestion.displayText);
      return suggestions;
    } else {
      return [];
    }
  });
};
```

## github

### 搜索仓库

直接使用github的开放api，通过传入搜索关键词与搜索语言，可以搜索到有关的github仓库，api调用采用分页方式，避免一次性传输过多数据量。

- `json schema`

```
{
  "total_count": 116,
  "incomplete_results": false,
  "items": [
    {
      "id": 28324684,
      "node_id": "MDEwOlJlcG9zaXRvcnkyODMyNDY4NA==",
      "name": "Data-Structures-and-Algorithms-in-C",
      "full_name": "LeechanX/Data-Structures-and-Algorithms-in-C",
      "private": false,
      "owner": {
        "login": "LeechanX",
        "id": 3104306,
        "node_id": "MDQ6VXNlcjMxMDQzMDY=",
        "avatar_url": "https://avatars.githubusercontent.com/u/3104306?
v=4",
        "gravatar_id": "",
        "url": "https://api.github.com/users/LeechanX",
        "html_url": "https://github.com/LeechanX",
        "followers_url":
"https://api.github.com/users/LeechanX/followers",
        "following_url":
"https://api.github.com/users/LeechanX/following{/other_user}",
```

```
        "gists_url": "https://api.github.com/users/LeechanX/gists{/gist_id}",
        "starred_url": "https://api.github.com/users/LeechanX/starred{/owner}{/repo}",
        "subscriptions_url": "https://api.github.com/users/LeechanX/subscriptions",
        "organizations_url": "https://api.github.com/users/LeechanX/orgs",
        "repos_url": "https://api.github.com/users/LeechanX/repos",
        "events_url": "https://api.github.com/users/LeechanX/events{/privacy}",
        "received_events_url": "https://api.github.com/users/LeechanX/received_events",
        "type": "User",
        "site_admin": false
      },
      "html_url": "https://github.com/LeechanX/Data-Structures-and-Algorithms-in-C",
      "description": "所有基础数据结构和算法的纯C语言实现，如各自排序、链表、栈、队列、各种树以及应用、图算法、字符串匹配算法、回溯、并查集等，献丑了",
      "fork": false,
      "url": "https://api.github.com/repos/LeechanX/Data-Structures-and-Algorithms-in-C",
      "forks_url": "https://api.github.com/repos/LeechanX/Data-Structures-and-Algorithms-in-C/forks",
      "keys_url": "https://api.github.com/repos/LeechanX/Data-Structures-and-Algorithms-in-C/keys{/key_id}",
      "collaborators_url": "https://api.github.com/repos/LeechanX/Data-Structures-and-Algorithms-in-C/collaborators{/collaborator}",
      "teams_url": "https://api.github.com/repos/LeechanX/Data-Structures-and-Algorithms-in-C/teams",
      "hooks_url": "https://api.github.com/repos/LeechanX/Data-Structures-and-Algorithms-in-C/hooks",
      "issue_events_url": "https://api.github.com/repos/LeechanX/Data-Structures-and-Algorithms-in-C/issues/events{/number}",
      "events_url": "https://api.github.com/repos/LeechanX/Data-Structures-and-Algorithms-in-C/events",
      "assignees_url": "https://api.github.com/repos/LeechanX/Data-Structures-and-Algorithms-in-C/assignees{/user}",
      "branches_url": "https://api.github.com/repos/LeechanX/Data-Structures-and-Algorithms-in-C/branches{/branch}",
      "tags_url": "https://api.github.com/repos/LeechanX/Data-Structures-and-Algorithms-in-C/tags",
      "blobs_url": "https://api.github.com/repos/LeechanX/Data-Structures-and-Algorithms-in-C/git/blobs{/sha}",
```

```
46          "git_tags_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/git/tags{/sha}",
47          "git_refs_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/git/refs{/sha}",
48          "trees_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/git/trees{/sha}",
49          "statuses_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/statuses/{sha}",
50          "languages_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/languages",
51          "stargazers_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/stargazers",
52          "contributors_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/contributors",
53          "subscribers_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/subscribers",
54          "subscription_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/subscription",
55          "commits_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/commits{/sha}",
56          "git_commits_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/git/commits{/sha}",
57          "comments_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/comments{/number}",
58          "issue_comment_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/issues/comments{/number}",
59          "contents_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/contents/{+path}",
60          "compare_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/compare/{base}...{head}",
61          "merges_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/merges",
62          "archive_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/{archive_format}{/ref}",
63          "downloads_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/downloads",
64          "issues_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/issues{/number}",
65          "pulls_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/pulls{/number}",
66          "milestones_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/milestones{/number}",
67          "notifications_url": "https://api.github.com/repos/LeechanX/Data-
    Structures-and-Algorithms-in-C/notifications{?
    since,all,participating}",
```

```
      "labels_url": "https://api.github.com/repos/LeechanX/Data-Structures-and-Algorithms-in-C/labels{/name}",
      "releases_url": "https://api.github.com/repos/LeechanX/Data-Structures-and-Algorithms-in-C/releases{/id}",
      "deployments_url": "https://api.github.com/repos/LeechanX/Data-Structures-and-Algorithms-in-C/deployments",
      "created_at": "2014-12-22T04:40:26Z",
      "updated_at": "2023-10-20T08:50:16Z",
      "pushed_at": "2019-10-13T14:17:20Z",
      "git_url": "git://github.com/LeechanX/Data-Structures-and-Algorithms-in-C.git",
      "ssh_url": "git@github.com:LeechanX/Data-Structures-and-Algorithms-in-C.git",
      "clone_url": "https://github.com/LeechanX/Data-Structures-and-Algorithms-in-C.git",
      "svn_url": "https://github.com/LeechanX/Data-Structures-and-Algorithms-in-C",
      "homepage": null,
      "size": 5669,
      "stargazers_count": 807,
      "watchers_count": 807,
      "language": "C",
      "has_issues": true,
      "has_projects": true,
      "has_downloads": true,
      "has_wiki": true,
      "has_pages": false,
      "has_discussions": false,
      "forks_count": 353,
      "mirror_url": null,
      "archived": false,
      "disabled": false,
      "open_issues_count": 1,
      "license": null,
      "allow_forking": true,
      "is_template": false,
      "web_commit_signoff_required": false,
      "topics": [

      ],
      "visibility": "public",
      "forks": 353,
      "open_issues": 1,
      "watchers": 807,
      "default_branch": "master",
      "score": 1.0
```

```
    },
    {
      "id": 4604718,
      "node_id": "MDEwOlJlcG9zaXRvcnk0NjA0NzE4",
      "name": "sortMethods",
      "full_name": "hackvilin/sortMethods",
      "private": false,
      "owner": {
        "login": "hackvilin",
        "id": 1831116,
        "node_id": "MDQ6VXNlcjE4MzExMTY=",
        "avatar_url": "https://avatars.githubusercontent.com/u/1831116?v=4",
        "gravatar_id": "",
        "url": "https://api.github.com/users/hackvilin",
        "html_url": "https://github.com/hackvilin",
        "followers_url": "https://api.github.com/users/hackvilin/followers",
        "following_url": "https://api.github.com/users/hackvilin/following{/other_user}",
        "gists_url": "https://api.github.com/users/hackvilin/gists{/gist_id}",
        "starred_url": "https://api.github.com/users/hackvilin/starred{/owner}{/repo}",
        "subscriptions_url": "https://api.github.com/users/hackvilin/subscriptions",
        "organizations_url": "https://api.github.com/users/hackvilin/orgs",
        "repos_url": "https://api.github.com/users/hackvilin/repos",
        "events_url": "https://api.github.com/users/hackvilin/events{/privacy}",
        "received_events_url": "https://api.github.com/users/hackvilin/received_events",
        "type": "User",
        "site_admin": false
      },
      "html_url": "https://github.com/hackvilin/sortMethods",
      "description": "C语言几种排序算法实现",
      "fork": false,
      "url": "https://api.github.com/repos/hackvilin/sortMethods",
      "forks_url": "https://api.github.com/repos/hackvilin/sortMethods/forks",
      "keys_url": "https://api.github.com/repos/hackvilin/sortMethods/keys{/key_id}",
```

```
140         "collaborators_url":
    "https://api.github.com/repos/hackvilin/sortMethods/collaborators{/coll
    aborator}",
141         "teams_url":
    "https://api.github.com/repos/hackvilin/sortMethods/teams",
142         "hooks_url":
    "https://api.github.com/repos/hackvilin/sortMethods/hooks",
143         "issue_events_url":
    "https://api.github.com/repos/hackvilin/sortMethods/issues/events{/numb
    er}",
144         "events_url":
    "https://api.github.com/repos/hackvilin/sortMethods/events",
145         "assignees_url":
    "https://api.github.com/repos/hackvilin/sortMethods/assignees{/user}",
146         "branches_url":
    "https://api.github.com/repos/hackvilin/sortMethods/branches{/branch}",
147         "tags_url":
    "https://api.github.com/repos/hackvilin/sortMethods/tags",
148         "blobs_url":
    "https://api.github.com/repos/hackvilin/sortMethods/git/blobs{/sha}",
149         "git_tags_url":
    "https://api.github.com/repos/hackvilin/sortMethods/git/tags{/sha}",
150         "git_refs_url":
    "https://api.github.com/repos/hackvilin/sortMethods/git/refs{/sha}",
151         "trees_url":
    "https://api.github.com/repos/hackvilin/sortMethods/git/trees{/sha}",
152         "statuses_url":
    "https://api.github.com/repos/hackvilin/sortMethods/statuses/{sha}",
153         "languages_url":
    "https://api.github.com/repos/hackvilin/sortMethods/languages",
154         "stargazers_url":
    "https://api.github.com/repos/hackvilin/sortMethods/stargazers",
155         "contributors_url":
    "https://api.github.com/repos/hackvilin/sortMethods/contributors",
156         "subscribers_url":
    "https://api.github.com/repos/hackvilin/sortMethods/subscribers",
157         "subscription_url":
    "https://api.github.com/repos/hackvilin/sortMethods/subscription",
158         "commits_url":
    "https://api.github.com/repos/hackvilin/sortMethods/commits{/sha}",
159         "git_commits_url":
    "https://api.github.com/repos/hackvilin/sortMethods/git/commits{/sha}",
160         "comments_url":
    "https://api.github.com/repos/hackvilin/sortMethods/comments{/number}",
```

```
        "issue_comment_url": "https://api.github.com/repos/hackvilin/sortMethods/issues/comments{/number}",
        "contents_url": "https://api.github.com/repos/hackvilin/sortMethods/contents/{+path}",
        "compare_url": "https://api.github.com/repos/hackvilin/sortMethods/compare/{base}...{head}",
        "merges_url": "https://api.github.com/repos/hackvilin/sortMethods/merges",
        "archive_url": "https://api.github.com/repos/hackvilin/sortMethods/{archive_format}{/ref}",
        "downloads_url": "https://api.github.com/repos/hackvilin/sortMethods/downloads",
        "issues_url": "https://api.github.com/repos/hackvilin/sortMethods/issues{/number}",
        "pulls_url": "https://api.github.com/repos/hackvilin/sortMethods/pulls{/number}",
        "milestones_url": "https://api.github.com/repos/hackvilin/sortMethods/milestones{/number}",
        "notifications_url": "https://api.github.com/repos/hackvilin/sortMethods/notifications{?since,all,participating}",
        "labels_url": "https://api.github.com/repos/hackvilin/sortMethods/labels{/name}",
        "releases_url": "https://api.github.com/repos/hackvilin/sortMethods/releases{/id}",
        "deployments_url": "https://api.github.com/repos/hackvilin/sortMethods/deployments",
        "created_at": "2012-06-09T03:46:58Z",
        "updated_at": "2022-03-29T07:14:54Z",
        "pushed_at": "2012-06-09T04:51:01Z",
        "git_url": "git://github.com/hackvilin/sortMethods.git",
        "ssh_url": "git@github.com:hackvilin/sortMethods.git",
        "clone_url": "https://github.com/hackvilin/sortMethods.git",
        "svn_url": "https://github.com/hackvilin/sortMethods",
        "homepage": null,
        "size": 104,
        "stargazers_count": 10,
        "watchers_count": 10,
        "language": "C",
        "has_issues": true,
        "has_projects": true,
        "has_downloads": true,
```

```
        "has_wiki": true,
        "has_pages": false,
        "has_discussions": false,
        "forks_count": 7,
        "mirror_url": null,
        "archived": false,
        "disabled": false,
        "open_issues_count": 0,
        "license": null,
        "allow_forking": true,
        "is_template": false,
        "web_commit_signoff_required": false,
        "topics": [

        ],
        "visibility": "public",
        "forks": 7,
        "open_issues": 0,
        "watchers": 10,
        "default_branch": "master",
        "score": 1.0
      },
    ]
  }
```

- api调用代码

分页获取内容

```
import axios from "axios"

//分页获取
export const githubSearchRepo =
(query:string,lang:string,page:number,perPage:number) => {
  const url = `https://api.github.com/search/repositories?
q=`+encodeURIComponent(query)+`+language:`+encodeURIComponent(lang)
  return axios({
    method:'get',
    url:url,
    params:{
      page:`${page}`,
      per_page:`${perPage}`
    }
  }).then((res:any)=>{
    if(res.status===200&&res.data){
      let repos = res.data.items.map((repo:any)=>{
        return {
```

```
            full_name:repo.full_name,
            description:repo.description,
            url:repo.html_url,
            updated_at:repo.updated_at,
            stars:repo.stargazers_count
          }
        })
        if(repos.length===0){
          repos = [{
            //搜索结果为空，star为-1
            full_name:'',
            description:'',
            url:'',
            updated_at:'',
            stars:-1
          }]
        }
        return repos
      }else{
        return [{
          //网络错误，star为-2
          full_name:'网络错误',
          description:'请检查网络情况',
          url:'',
          updated_at:'',
          stars:-2
        }]
      }
    })
}

export const githubSearchRepoSize = (query:string,lang:string) => {
    const url = `https://api.github.com/search/repositories?
q=`+encodeURIComponent(query)+`+language:`+encodeURIComponent(lang)
    return axios({
      method:'get',
      url:url,
    }).then((res:any)=>{
      if(res.status===200&&res.data){
        return res.data.total_count
      }else{
        return -1
      }
    })
}
```

## mediawiki

### 维基百科搜索

将gpt联想的关键词，通过 `mediawiki` 的api在维基百科上进行搜索，返回给对应关键词的维基百科链接与标题,方便用户直接查看维基百科的内容.

- `json schema`

```
{
    "pages": [
        {
            "id": 345741,
            "key": "实时操作系统",
            "title": "实时操作系统",
            "excerpt": "<span class=\"searchmatch\">时</span>。这种特性保证了各个任务的及时执行。 设计<span class=\"searchmatch\">实时</span>操作<span class=\"searchmatch\">系统</span>的首要目标不是高的吞吐量，而是保证任务在特定时间内完成，因此衡量一个<span class=\"searchmatch\">实时</span>操作<span class=\"searchmatch\">系统</span>坚固性的重要指标，是<span class=\"searchmatch\">系统</span>从接收一个任务，到完成该任务所需的时间，其时间的变化称为抖动。可以依抖动將<span class=\"searchmatch\">实时</span>操作<span class=\"searchmatch\">系统</span>分為兩種：硬实<span class=\"searchmatch\">时</span>操作<span class=\"searchmatch\">系统</span>及软<span class=\"searchmatch\">实时</span>操作<span class=\"searchmatch\">系统</span>，硬实<span class=\"searchmatch\">时</span>操作系统比软实时操作系统有更少的抖动：",
            "matched_title": null,
            "description": null,
            "thumbnail": null
        }
    ]
}
```

- `api调用`

```
import axios from 'axios';

export interface SearchResult {
    title: string;
    key: string;
    url: string;
}

export const wikipediaSearch=(keyword: string):Promise<SearchResult⟹ {
```

```
    const apiUrl = 'https://zh.wikipedia.org/w/rest.php/v1/search/page?q='+encodeURIComponent(keyword)+'&limit=1';
    let searchResult: SearchResult
    return axios({
        method: 'get',
        url: apiUrl,
    }).then((response) => {
        if(response.status !== 200) {
            searchResult={
                title: 'null',
                key: 'null',
                url: 'null',
            }
            throw new Error('wikipedia search failed');
        }else if(response.data.pages.length === 0) {
            searchResult={
                title: 'null',
                key: 'null',
                url: 'null',
            }
        }else {
            searchResult={
                title: response.data.pages[0].title,
                key: response.data.pages[0].key,
                url: 'https://zh.wikipedia.org/wiki/'+response.data.pages[0].key,
            }
        }
        return searchResult;
    });
}
```

## StackExchange

### 文章推荐

在首页展示 `stackoverflow` 的推荐问题，展示问题内容，浏览记录，回答数与分类标签。

- `json schema`

```
{
    "items": [
        {
            "tags": [
                "reactjs",
                "firebase",
```

```
                "firebase-authentication"
            ],
            "owner": {
                "account_id": 23015920,
                "reputation": 778,
                "user_id": 17137694,
                "user_type": "registered",
                "profile_image":
"https://www.gravatar.com/avatar/7d086148ca0d3e34dde09c77d3301e4b?
s=256&d=identicon&r=PG",
                "display_name": "aabdulahad",
                "link":
"https://stackoverflow.com/users/17137694/aabdulahad"
            },
            "is_answered": false,
            "view_count": 6,
            "answer_count": 1,
            "score": 0,
            "last_activity_date": 1697976815,
            "creation_date": 1697975977,
            "question_id": 77339859,
            "content_license": "CC BY-SA 4.0",
            "link":
"https://stackoverflow.com/questions/77339859/custom-claims-and-
checking-for-pro-membership",
            "title": "Custom Claims and Checking for Pro Membership"
        },
        {
            "tags": [
                "reactjs",
                "tailwind-css"
            ],
            "owner": {
                "account_id": 27427891,
                "reputation": 51,
                "user_id": 22247455,
                "user_type": "registered",
                "profile_image":
"https://www.gravatar.com/avatar/122769b1fcce74fc19a6454ba7c04716?
s=256&d=identicon&r=PG&f=y&so-version=2",
                "display_name": "testing123",
                "link":
"https://stackoverflow.com/users/22247455/testing123"
            },
            "is_answered": true,
            "view_count": 1986,
```

```
            "answer_count": 4,
            "score": 4,
            "last_activity_date": 1697976699,
            "creation_date": 1689695468,
            "last_edit_date": 1689696737,
            "question_id": 76714567,
            "content_license": "CC BY-SA 4.0",
            "link": "https://stackoverflow.com/questions/76714567/cant-use-shadcn-components",
            "title": "Can&#39;t use Shadcn components"
        }
    ],
    "has_more": true,
    "quota_max": 300,
    "quota_remaining": 266
}
```


- api调用代码

```
import axios from 'axios';

export interface StackOverflowQuestion {
  title: string;
  link: string;
  view_count?: number;
  answer_count?: number;
  tags?: string[];
  owner_name?: string;
}

export const getStackOverflowQuestions = async (tag:string): Promise<StackOverflowQuestion[]> => {
  const apiUrl =
    `https://api.stackexchange.com/2.3/questions?&order=desc&sort=activity&tagged=${tag}&site=stackoverflow`;
  const response = await axios({
    method: 'get',
    url: apiUrl,
  });
  if (response.status !== 200) {
    throw new Error('get Stack Overflow questions failed');
  } else {
    const questions = response.data.items.map((item: any) => ({
      title: item.title,
      link: item.link,
      view_count: item.view_count,
```

```
        answer_count: item.answer_count,
        tags: item.tags,
        owner_name: item.owner.display_name,
      }));
      return questions;
    }
  };
```

## api使用示例

### 获取联想问题

通过给gpt设定prompt，让其以规定格式返回我所需要的内容，再通过正则表达式匹配，得到我需要的联想问题，同时传给对应联想问题展示组件，将问题展示出来。

以下是得到联想问题的函数

```
const getSuggestQuestion=(question:string='')=>{
    suggestQuestionsLoading.value=true
    let prompt=`假设你是搜索引擎助手,我给出问题,请你给出6个我接下来可能会问的相关联想问题,每一个联想问题单独用{}括起来,例如{如何解析json文件},请不要包含任何多余的内容,我要问的问题的内容是${question}`
    if(question.length==0){
        prompt=`请给我6个有关于编程技术方面的问题,问题用{}单独括起来,例如{如何解析json文件},请不要包含任何多余的内容`
    }
    getGptResponse({
        'messages':[
            {'role':'user','content':prompt},
        ]
    },gptApiKey.value).then((res:string)=>{
        //通过正则表达式匹配
        const getQuestions=async (res:string):Promise<string[]>=>{
            const regex = /{([^}]+)}/g;
            const questions=res.match(regex)
            return questions?.map((q: string) => q.slice(1, -1)) || [];
        }
        getQuestions(res).then((res)=>{
            suggestQuestions.value=res
            suggestQuestionsLoading.value=false
        })
    }).catch((err)=>{
        console.log(err)
        suggestQuestions.value=[err.message||'error']
        suggestQuestionsLoading.value=false
```

```
        })
    }
```

传值给对应子组件，将问题展示出来，

```
<div class="w-3/4">
    <div class="w-full mb-4 mt-5">
        <h2 class="text-2xl font-bold">猜你想搜</h2>
    </div>
    <el-skeleton :rows="1" animated :loading="suggestQuestionsLoading">
        <template #default>
            <SuggestQuestions :questions="suggestQuestions"
@select="handleSuggestionsSelect"></SuggestQuestions>
        </template>
    </el-skeleton>
</div>
```

同理，可以展示出问题的联想关键词。

## 获取web搜索结果

在主组件中调用web搜索api，获取到搜索结果后，传值给子组件，通过子组件渲染界面。

以下是主组件中调用api的函数

```
bingWebSearch(question.value+`
${preferredLanguage.value}`,webCurrentPage.value,webPageSize.value,bingApiK
ey.value).then((res)=>{
    if(res.length>0){
        webSearchResults.value=res
        webLoading.value=false
    }else{
        console.log('no result')
        webLoading.value=false
    }
})
```

界面渲染

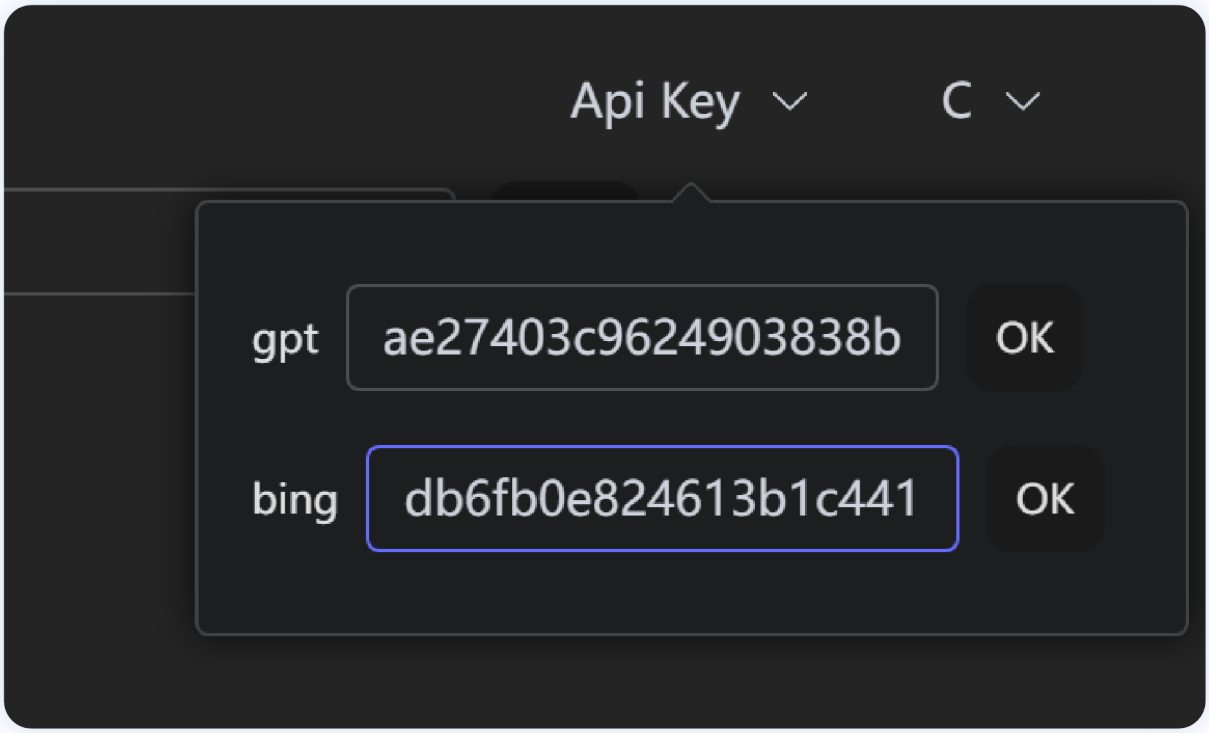
```
<!-- web search -->
<el-card class="my-2.5 w-full" v-if="resultSource===sources.WEB">
    <template #header>
        <span class="flex justify-start font-bold">Web search</span>
    </template>
```

```
    <el-skeleton :rows="8" :loading="webLoading" animated>
        <template #template>
            <div class="github-loading-skeleton">
                <div class="github-loading-skeleton-single" v-for="(index) in 10" :key="index">
                    <el-skeleton-item variant="p" class="mt-1.5 mb-2" style="width: 80%;"></el-skeleton-item>
                    <el-skeleton-item variant="text" class="my-1.5" style="width: 33%;"></el-skeleton-item>
                    <el-skeleton-item variant="text" class="my-1.5" style="width: 100%;"></el-skeleton-item>
                    <el-skeleton-item variant="text" class="my-1.5" style="width: 45%;"></el-skeleton-item>
                </div>
            </div>
        </template>
        <template #default>
            <Weblink :links="webSearchResults"></Weblink>
        </template>
    </el-skeleton>
    <div class="flex justify-center items-center">
        <el-pagination :total="webTotalCount" v-model:current-page="webCurrentPage" v-model:page-size="webPageSize" layout="prev,pager,next" @current-change="handleWebPageChange"></el-pagination>
    </div>
</el-card>
```

同理可以得到github搜索界面与stackoverflow文章界面

## api密钥储存

api密钥明文储存在代码中是不安全的行为，因此我使用 `electron store` 模块，将api密钥本地存储。第一次使用软件时，软件会提示要求输入gpt与bing的api密钥，输入完成后才能够使用。




- 储存与读取api密钥

  由于 `electron store` 模块在渲染进程中使用会有问题，因此需要在主进程中提供事件监听函数，通过 `electron` 的 `ipcMain` 与 `ipcRender` 模块在主进程与渲染进程间进行通信，具体代码如下

  - 主进程

```
import Store from 'electron-store'
const store = new Store()
// IPC listener
ipcMain.on('electron-store-get',  (event, val) => {
  event.returnValue = store.get(val);
});
ipcMain.on('electron-store-set',  (event, key, val) => {
  store.set(key, val);
});

ipcMain.on('electron-store-clear',  (event) => {
  store.clear();
});
```

  - 渲染进程

```
    const submitGptApiKey=()=>{
        if(gptApiKey.value.length===0){
```

```
        ElMessage({
            message: 'key不能为空',
            type: 'warning'
        })
        return
    }
    ipcRenderer.send('electron-store-set','gpt-api-key',gptApiKey.value)
    ipcRenderer.send('electron-store-set','gpt-api-key-filled',true)
    setTimeout(() => {
        isGptApiFilled.value=ipcRenderer.sendSync('electron-store-get','gpt-api-key-filled')
        gptApiKey.value=ipcRenderer.sendSync('electron-store-get','gpt-api-key')
    }, 100);
}

const submitBingApiKey=()=>{
    if (bingApiKey.value.length===0) {
        ElMessage({
            message: 'key不能为空',
            type: 'warning'
        })
        return
    }
    ipcRenderer.send('electron-store-set','bing-api-key',bingApiKey.value)
    ipcRenderer.send('electron-store-set','bing-api-key-filled',true)
    setTimeout(() => {
        isBingApiFilled.value=ipcRenderer.sendSync('electron-store-get','bing-api-key-filled')
        bingApiKey.value=ipcRenderer.sendSync('electron-store-get','bing-api-key')
    }, 100);
}
```