

# CS3219 OTOT Task B

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- **Repo Link:** <https://github.com/aidanaden/otot-b>

## Tech stack used

- [NextJS](#) (frontend + backend API routes via nextjs' serverless functions)
- [TailwindCSS](#) (frontend styling)
- [Prisma](#) (database ORM)
- MySQL (database used)
- [tRPC](#) (used to set up API routes with end-to-end typesafety)

## Hosting

- [Vercel](#) (provides easy integration with NextJS + continuous deployment)
- [Planetscale](#) (highly scalable serverless MySQL database with generous free plans)

## Task B1: Simple Backend

### Requirements

1. MySQL (SQL database used)
2. NodeJS >= v14.19.2
3. [Postman](#) is used to (manually) test CRUD for the API.

### Local Deployment

1. Install docker by clicking [here](#)
2. Install pnpm by clicking [here](#)
3. Copy the `.env-example` file to `.env` and paste the following:

```
# Prisma
DATABASE_URL=mysql://root:root@localhost:3369/mysqlpdb

# Next Auth
NEXTAUTH_SECRET=secret

# Calendarific
CALENDARIFIC_API_KEY=00e9be3d9730c3d5504e5c4794788bc428cdeea5
```

4. Run the following commands to deploy the app locally

```
# install packages
pnpm install

# start local mysql db, deploy schema, build source files
pnpm build:local
```

```
# run locally
pnpm start
```

## Verify successful deployment

Run the following commands to verify successful local deployment

```
# query the /api/activity endpoint
curl http://localhost:3000/api/activity

# expected output
[]
```

Visit `http://localhost:3000` to confirm successful frontend deployment

## Testing via Postman

Import the Postman collection via [this link](#).

2 versions of the `API_URL` variable exists, one set to `localhost:3000` (locally deployment) and one set to `https://otot-b-phi.vercel.app` (vercel deployment)

Explanation of HTTP requests:

- `activity` : list all activities in database (will be empty if using local MySQL database)
- `activity/:id` : returns error if ID does not exist
  - `GET` : returns activity with the specified ID
  - `PATCH / PUT` : updates specified field(s) in request body given an ID
  - `DELETE` : removes the activity with the given ID from the database

Note:

- `params` and `body` would need to be updated manually, where they are necessary.

## Screenshots

**GET : get activities given empty database**

Postman interface showing a GET request to `http://localhost:3000/api/activities` with the response body:

```
{
  "activities": [
    {
      "id": 1,
      "name": "Test activity 1",
      "location": "Test location 1",
      "category": "Test category 1"
    },
    {
      "id": 2,
      "name": "Test activity 2",
      "location": "Test location 2",
      "category": "Test category 2"
    }
  ]
}
```

The console shows the following logs:

```
GET http://localhost:3000/api/activities 200 12.31 s
GET http://localhost:3000/api/activities 200 698 ms
GET http://localhost:3000/api/activities 200 448 ms
GET http://localhost:3000/api/activities 200 482 ms
```

## POST : create invalid activity (missing category)

Postman interface showing a POST request to `http://localhost:3000/api/activities` with the response body:

```
{
  "statusCode": 500,
  "message": "[\n {\n   \"code\": \"invalid_type\", \"expected\": \"object\", \"received\": \"undefined\", \n   \"path\": [\n     \"category\"\n   ], \"message\": \"Required\"\n }]\n]"
}
```

The console shows the following logs:

```
GET http://localhost:3000/api/activities 200 698 ms
GET http://localhost:3000/api/activities 200 448 ms
GET http://localhost:3000/api/activities 200 482 ms
POST http://localhost:3000/api/activities 500 13 ms
```

## POST : create valid activity

Home Workspaces API Network Explore

Search Postman

My Workspace

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GET Get all activities

GET Get valid activity

GET Get invalid activity

PUT Update activity with valid data

PUT Update activity with invalid data

DEL Delete valid activity

DEL Delete invalid activity

POST Create activity with valid data

POST Create activity with invalid data

GET Get current year holidays for SG

GET Get any year holidays for any country

Postman Echo

cs3219-otot-b / Create activity with valid data

POST `{{APLURL}}/activity`

Params Authorization Headers (8) Body Pre-request Script Tests Settings

none form-data x-www-form-urlencoded raw binary GraphQL JSON

```
1 {
2   "name": "Test activity 3",
3   "location": "Test location 3",
4   "category": "Test category 3",
5   "name": "Test category 3"
6 }
7
```

Body Cookies (2) Headers (7) Test Results

Status: 200 OK Time: 31 ms Size: 423 B Save Response

Pretty Raw Preview Visualize JSON

```
1 {
2   "id": "c19friae0000udevxsblzox",
3   "createdAt": "2022-10-19T15:01:22.562Z",
4   "updatedAt": "2022-10-19T15:01:22.562Z",
5   "name": "Test activity 3",
6   "location": "Test location 3",
7   "categoryId": "c19friae0000udev@usfcm4q"
8 }
```

2 Errors All Logs Clear

GET http://localhost:3000/api/activity 200 448 ms

GET http://localhost:3000/api/activity 200 482 ms

POST http://localhost:3000/api/activity 500 13 ms

POST http://localhost:3000/api/activity 200 31 ms

Cookies Capture requests Bootcamp Runner Trash

## PATCH / PUT : update name of activity with invalid value

Home Workspaces API Network Explore

Search Postman

My Workspace

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GET Get all activities

GET Get valid activity

GET Get invalid activity

PUT Update activity with valid data

PUT Update activity with invalid data

DEL Delete valid activity

DEL Delete invalid activity

POST Create activity with valid data

POST Create activity with invalid data

GET Get current year holidays for SG

GET Get any year holidays for any country

Postman Echo

cs3219-otot-b / Update activity with invalid data

PUT `{{APLURL}}/activity/c19friae0000udevxsblzox`

Params Authorization Headers (8) Body Pre-request Script Tests Settings

none form-data x-www-form-urlencoded raw binary GraphQL JSON

```
1 {
2   "name": 123123
3 }
```

Body Cookies (2) Headers (7) Test Results

Status: 500 Internal Server Error Time: 10 ms Size: 471 B Save Response

Pretty Raw Preview Visualize JSON

```
1 {
2   "statusCode": 500,
3   "message": "[\n  {\n    \"code\": \"invalid_type\", \"expected\": \"string\", \"received\": \"number\", \"path\": [\n      \"name\"\n    ], \"message\": \"Expected string, received number\" }\n  ]\""}
4
```

2 Errors All Logs Clear

GET http://localhost:3000/api/activity 200 482 ms

POST http://localhost:3000/api/activity 500 13 ms

POST http://localhost:3000/api/activity 200 31 ms

PUT http://localhost:3000/api/activity/c19friae0000udevxsblzox 500 10 ms

Cookies Capture requests Bootcamp Runner Trash

## PATCH / PUT : update name of activity with valid value

Postman interface showing a PUT request to update an activity. The request is successful (Status: 200 OK).

**Request:** PUT `{{API_URL}}/activity/cl9friade0000udevrxsblzox`

**Body (JSON):**

```
{  "name": "Test activity updated",  "location": "Test location",  "category": {    "name": "Test category"  }}
```

**Response (JSON):**

```
{  "id": "cl9friade0000udevrxsblzox",  "name": "Test activity updated",  "location": "Test location",  "category": {    "id": "cl9friade0001udev8ufcm4q",    "createdAt": "2022-10-19T15:01:22.562Z",    "updatedAt": "2022-10-19T15:04:23.986Z",    "name": "Test category"  }}
```

**Console:**

```
POST http://localhost:3000/api/activity 500 13 ms
POST http://localhost:3000/api/activity 200 31 ms
PUT http://localhost:3000/api/activity/cl9friade0000udevrxsblzox 500 10 ms
PUT http://localhost:3000/api/activity/cl9friade0000udevrxsblzox 200 30 ms
```

## GET : get invalid activity given invalid id

Postman interface showing a GET request to retrieve an activity by ID. The request fails (Status: 500 Internal Server Error).

**Request:** GET `{{API_URL}}/activity/123`

**Response (JSON):**

```
{  "statusCode": 500,  "message": "Activity with id 123 not found"}
```

**Console:**

```
DELETE http://localhost:3000/api/activity/123 500 16 ms
GET http://localhost:3000/api/activity/cl9d8gb6v0001b09710cg3t1 500 13 ms
GET http://localhost:3000/api/activity/cl9friade0000udevrxsblzox 200 9 ms
GET http://localhost:3000/api/activity/123 500 14 ms
```

## GET : get valid activity given valid id

Postman interface showing a REST client request for "Get valid activity". The request is a GET call to `cs3219-otot-b / Get valid activity` with the URL `{{(API_URL)}}/activity/cl9friade0000udevrxsblzox`. The response is a JSON object with details about the activity and its category.

```
{
  "id": "cl9friade0000udevrxsblzox",
  "createdAt": "2022-10-19T15:01:22.562Z",
  "updatedAt": "2022-10-19T15:04:23.985Z",
  "name": "Test activity updated",
  "location": "Test location",
  "categoryId": "cl9friade0001udev8usfcm4q",
  "category": {
    "id": "cl9friade0001udev8usfcm4q",
    "createdAt": "2022-10-19T15:01:22.562Z",
    "updatedAt": "2022-10-19T15:04:23.985Z",
    "name": "Test category"
  }
}
```

The console shows the following log entries:

- PUT `http://localhost:3000/api/activity/cl9friade0000udevrxsblzox` 200 38 ms
- DELETE `http://localhost:3000/api/activity/123` 500 16 ms
- GET `http://localhost:3000/api/activity/cl9d0gbv0001b09710cg3t1` 500 13 ms
- GET `http://localhost:3000/api/activity/cl9friade0000udevrxsblzox` 200 9 ms

## DELETE : remove invalid activity with invalid id

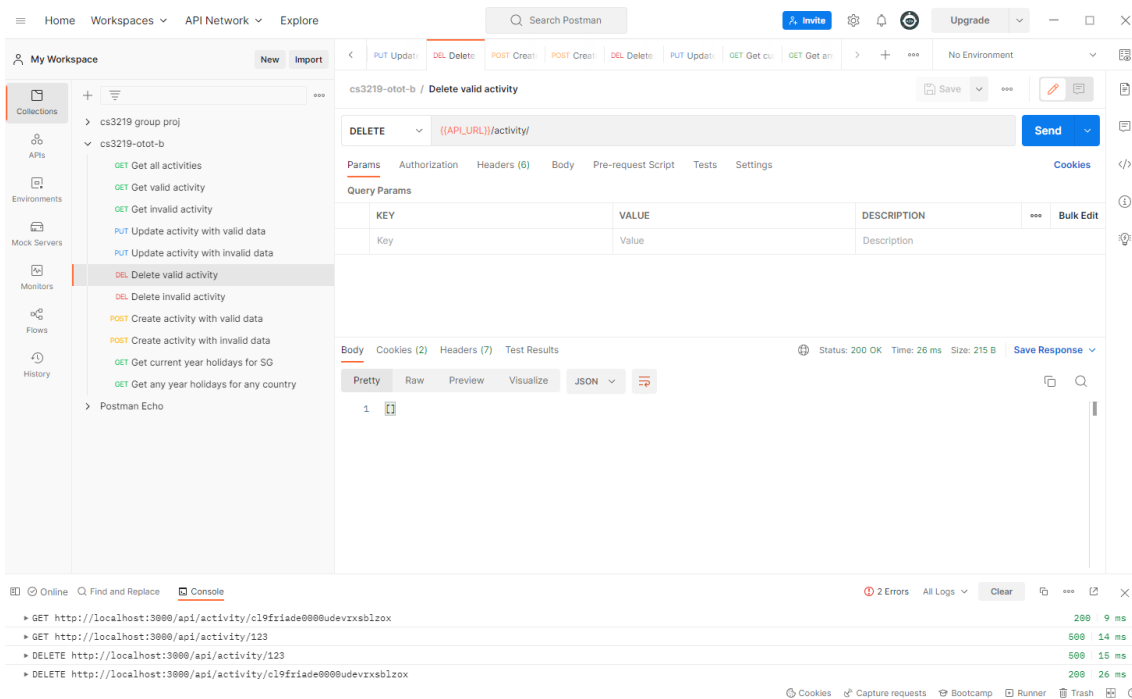
Postman interface showing a REST client request for "Delete invalid activity". The request is a DELETE call to `cs3219-otot-b / Delete invalid activity` with the URL `{{(API_URL)}}/activity/123`. The response is a JSON object indicating an error.

```
{
  "statusCode": 500,
  "message": "\nInvalid 'prisma.activity.delete()' invocation:\n\nNaN operation failed because it depends on one or more records that were required but not found. Record to delete does not exist."
}
```

The console shows the following log entries:

- POST `http://localhost:3000/api/activity` 200 31 ms
- PUT `http://localhost:3000/api/activity/cl9friade0000udevrxsblzox` 500 10 ms
- PUT `http://localhost:3000/api/activity/cl9friade0000udevrxsblzox` 200 38 ms
- DELETE `http://localhost:3000/api/activity/123` 500 16 ms

## DELETE : remove valid activity with valid id



## Task B2.1: Testing through Continuous Integration

Jest was used to test the API routes locally as well as via Github Action.

### Summary of CI

- [Jest](#) used to test API endpoints
- Local MySQL database used for tests
- Postman collection can be found [here](#) with variables already set
- Github Action yaml file can be viewed [here](#).

### Local test output

```
~/react/otot-b | main !2 24m 33s | 23:22:49
> npm test
WARN Load npm builtin configs failed, you can use "npm config ls" to show builtin configs. And then use "npm config --global set <key> <value>" to migrate configs from builtin to global.

otot-b@0.1.0 test /home/aidan/react/otot-b
> NODE_OPTIONS=--experimental-vmodules jest

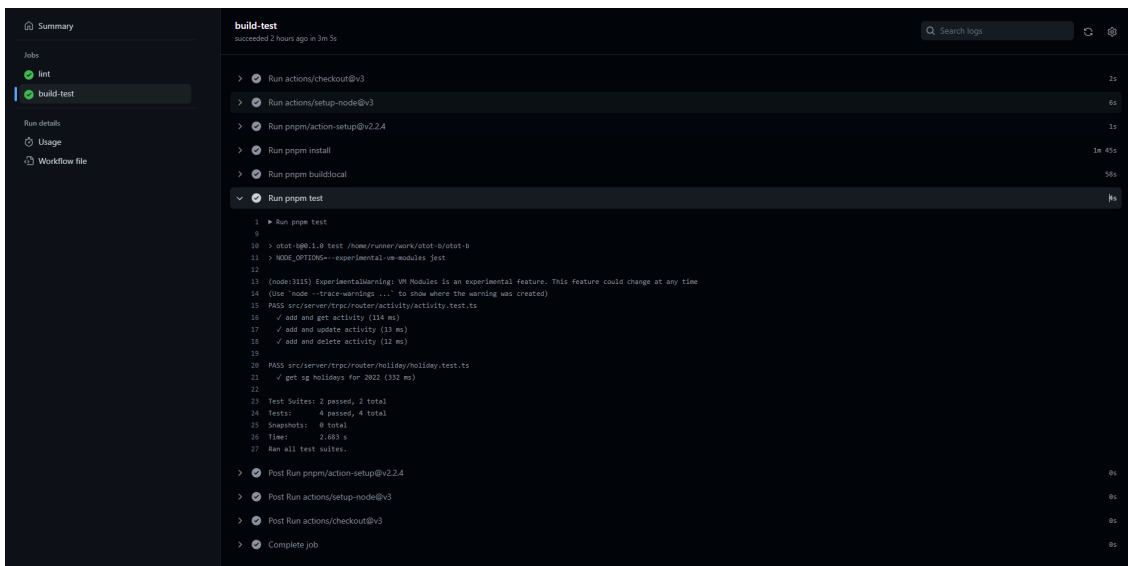
(node:7372) ExperimentalWarning: VM Modules is an experimental feature. This feature could change at any time
(node:7372) ExperimentalWarning: VM Modules is an experimental feature. This feature could change at any time
(node:7378) ExperimentalWarning: VM Modules is an experimental feature. This feature could change at any time
(node:7378) ExperimentalWarning: VM Modules is an experimental feature. This feature could change at any time
PASS src/server/trpc/router/activity/activity.test.ts
  ✓ add and get activity (120 ms)
  ✓ add and update activity (36 ms)
  ✓ add and delete activity (110 ms)

PASS src/server/trpc/router/holiday/holiday.test.ts
  ✓ get sg holidays for 2022 (2703 ms)

Test Suites: 2 passed, 2 total
Tests: 4 passed, 4 total
Snapshots: 0 total
Time: 5.017 s
Ran all test suites.

~/react/otot-b | main !2 6s | 23:22:57
>
```

### Testing via [Github Action](#)

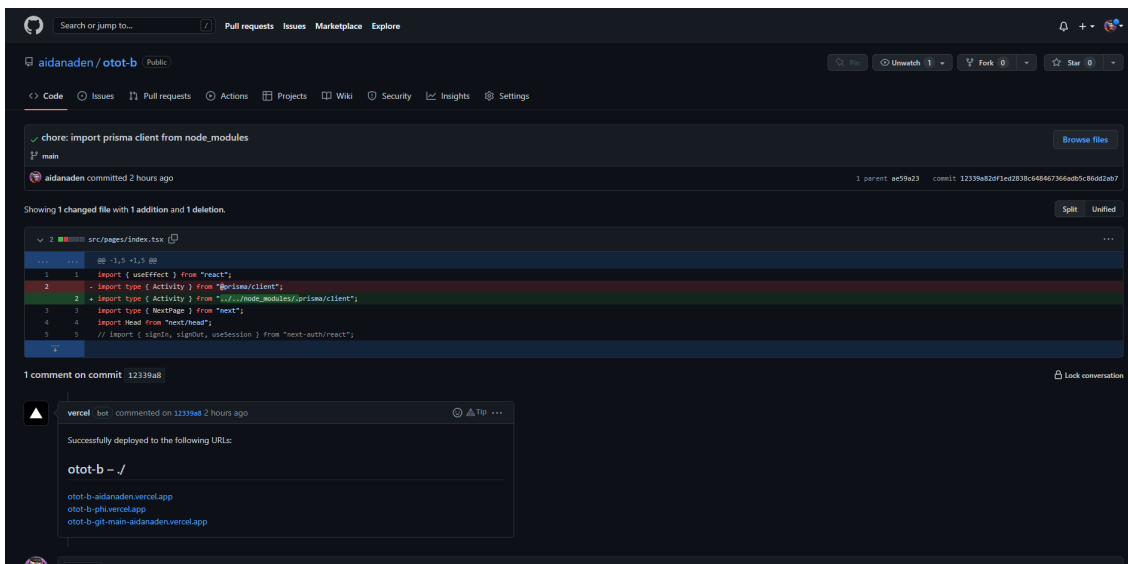


## Task B2.2: Deploying through Continuous Deployment

Since vercel is used to host both the frontend + backend, continuous deployment is automatically provided via vercel's github integration

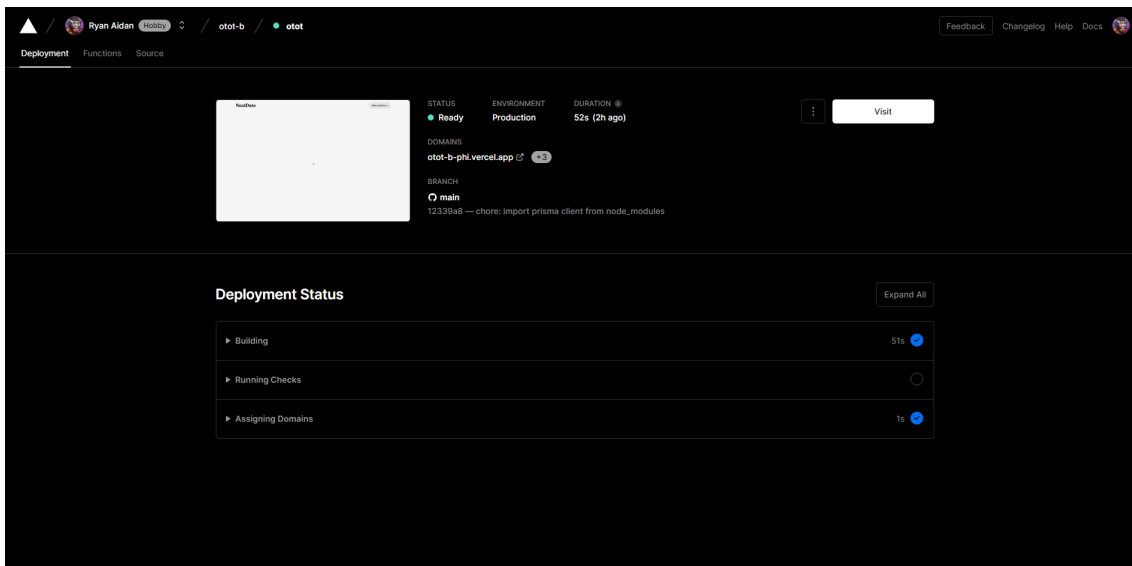
### Continuous Deployment Screenshots

#### Vercel deployment



#### Deployed via vercel





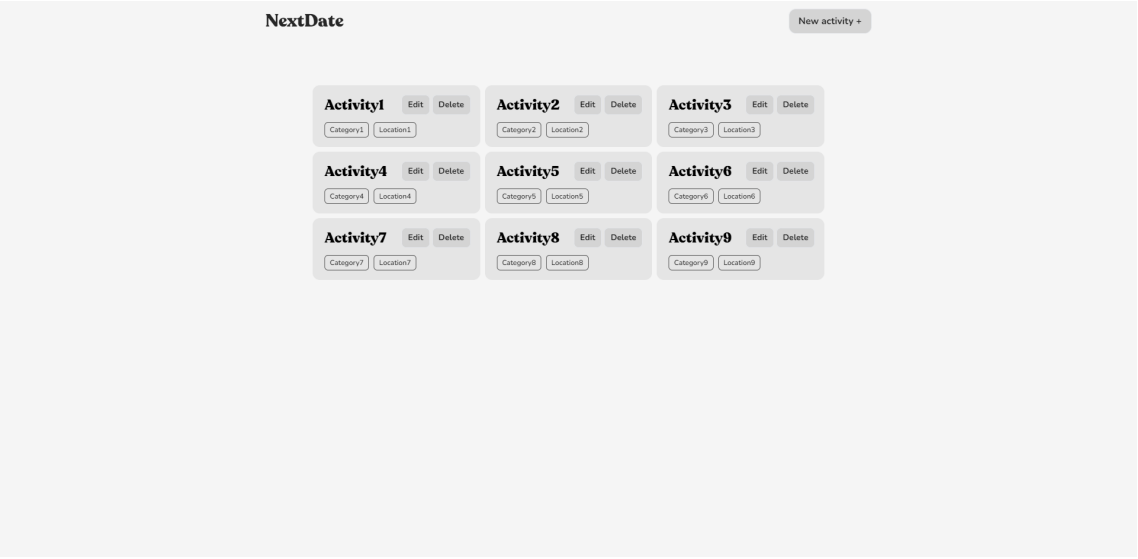
## Task B3: Implement a Frontend

The website is deployed on Vercel and can be accessed through this link <https://otot-b-phi.vercel.app/>.

The home page automatically loads all of the activities currently stored in the live db hosted in planetscale.

1. To create an "activity", click on the "create activity" button on the top right of the screen.
2. To edit an activity, click on the "edit" button in the top right of the activity.
3. To delete an activity, click on the "delete" button in the top right of the activity.

Screenshot of Activities on frontend



# NextDate

New activity +

## Activity1

Edit

Delete

Category1

Location1

## Activity2

Edit

Delete

Category2

Location2

## Activity3

Edit

Delete

Category3

Location3

## Activity4

Edit

Delete

Category4

Location4

## Activity5

Edit

Delete

Category5

Location5

## Activity6

Edit

Delete

Category6

Location6

## Activity7

Edit

Delete

## Task B4: Pulling data from Serverless Function to Frontend

The serverless API function will be pulling data from [Calendarific's API](#) to query the holidays in SG for the current year

The serverless function will be run using Next.JS' serverless API routes. When a client queries the API route, the serverless function will query the calendarific API endpoint (given a valid country code and year) and return a list of holidays.

To view the holiday data, a page has been created on the frontend to display the holidays returned here <https://otot-b-phi.vercel.app/holidays>.

### Screenshot of B4

#### Serverless function API route (via Postman)

The screenshot displays the Postman interface with a GET request configured for the endpoint `((API_URL))/holiday?country=us&year=2021`. The request is sent, and the response is shown in the 'Body' tab, which is formatted as JSON. The response details are as follows:

- Status: 200 OK
- Time: 1692 ms
- Size: 30129 KB

The JSON response body contains the following data:

```
{
  "name": "New Year's Day",
  "description": "New Year's Day is the first day of the Gregorian calendar, which is widely used in many countries such as the USA.",
  "country": {
    "id": "us",
    "name": "United States"
  },
  "date": {
    "iso": "2022-01-01",
    "datetime": {
      "year": 2022,
      "month": 1,
      "day": 1
    }
  },
  "type": [
    "Local holiday"
  ],
  "uxid": "us/new-year-day",
  "locations": "MA, MS, NY, WI",
  "states": [
    {
      "id": 25,
      "abbrev": "MA",
      "name": "Massachusetts",
      "exception": null
    }
  ]
}
```

The bottom of the screenshot shows the console with several log entries, including the successful GET request to the API endpoint and its response time of 1692 ms.

View all SG holidays for 2022

← → ↻ localhost:3000/holidays

NextDate

New activity +

New Year's Day

SG1/1/2022

Second Day Of Lunar New Year

SG2/2/2022

International Women's Day

SG3/8/2022

Good Friday

SG4/15/2022

Labour Day

SG5/1/2022

Mother's Day

SG5/8/2022

International

Thaipusam

SG1/18/2022

Valentine's Day

SG2/14/2022

March Equinox

SG3/20/2022

Easter Saturday

SG4/16/2022

Day Off For Labour Day

SG5/2/2022

Vesak Day

SG5/15/2022

Father's Day

Lunar New Year's Day

SG2/1/2022

Total Defense Day

SG2/15/2022

April Fool's Day

SG4/1/2022

Easter Sunday

SG4/17/2022

Hari Raya Puasa

SG5/3/2022

Day Off For Vesak Day

SG5/16/2022

June Solstice

View all UK holidays for 2011

← → ↻

localhost:3000/holidays?country=uk&year=2011

🏠

☆

🔍

👤

⋮

NextDate

New activity +

New Year's Day

GB1/1/2011

New Year's Day Observed

GB1/3/2011

2nd January (Substitute Day)

GB1/4/2011

Twelfth Night

GB1/5/2011

Epiphany

GB1/6/2011

Orthodox Christmas Day

GB1/7/2011

Orthodox New Year

GB1/14/2011

Tu B'Shevat (Arbor Day)

GB1/20/2011

Burns Night

GB1/25/2011

Lunar New Year

GB2/3/2011

Valentine's Day

GB2/14/2011

Milad Un Nabi (Mawlid)

GB2/16/2011

St. David's Day

GB3/1/2011

Maha Shivaratri

GB3/2/2011

Carnival / Shrove Tuesday / Pancake Day

GB3/8/2011

Carnival / Ash Wednesday

St Patrick's Day

GB3/17/2011

Holi

GB3/20/2011

## **Potential improvements**

In the future, google location API can be integrated to allow location autocomplete when creating activities (instead of having to manually enter the activity location information).