Converting addresses to coordinates

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Addresses are messy

Street addresses are extremely messy and very *human* datasets.

Addresses can refer to many different things:

- A building
- A floor in a building
- A collection of buildings
- A city/town/province or other region

Additionally:

- Addresses are often incomplete
- Addresses vary significantly internationally

Geocoding: Forwards & Reverse

Geocoding is the process of converting between addresses and geographic coordinates.

- **Forward geocoding** *attempts* to converts an address into coordinates.
- **Reverse geocoding** *attempts* converts coordinates into an address.

Geocoding packages

There are **several** packages that provide geocoding services - because there are multiple **commercial** geocoding services.

{ggmaps}

Before June 2018 the most obvious and best package for geocoding was `{ggmaps}`:

- It used Google's industry leading Google Maps API
- It was free and easy to use

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Nowadays you **must** provide Google with your **credit card details** to use this service.

- Currently you are provided $200 free credits per month
- Refer to Google's pricing pages for up to date details: cloud.google.com/maps-platform/pricing

{tidygeocoder}

I strongly recommend using `{tidygeocoder}` for all your forward geocoding needs.

The package rolls together a total of **four** different geocoding services - but we only care about two of them.

{tidygeocoder}

Geocoding service	Requires billing details?	Details
LocationIQ	✗	The free tier allows 5,000 requests/day and can be used commercially.
 OpenStreetMap	✗	OpenStreetMap provide an always free geocoding service called **Nominatim**. It's **not** designed for commercial usage, see the Usage Policy for more details.

My Turn

I'll import and geocode the addresses in the UK Addresses tab of our Excel file.

(RSTUDIO CODING SLIDE)

Environmental Variables

One of the most flexible ways to **permanently** store API keys on your machine.

The file is most easily manipulated with the `{usethis}` package:

```
usethis::edit_r_environ()
```

.Renviron

Variables are stored in the file as key-value pairs:

> LOCATIONIQ_API_KEY=KEY
>
> OTHER_API_KEY=KEY

The file **must** end with an empty line or it won't work.

(RSTUDIO CODING SLIDE)

Your Turn

Convert the addresses in the "International Addresses" worksheet into coordinates and visualise them.

1. Import the "International Addresses" worksheet
2. Re-use the `mutate(across(...))` code to remove NA values
3. Combine together `address_line_1`, `address_line_2`, `address_line_3` into `full_address`
4. Use `geocode()` to convert the addresses into coordinates
5. Visualise the locations with `{mapview}`