Data modelling for backend with mongoose

Important

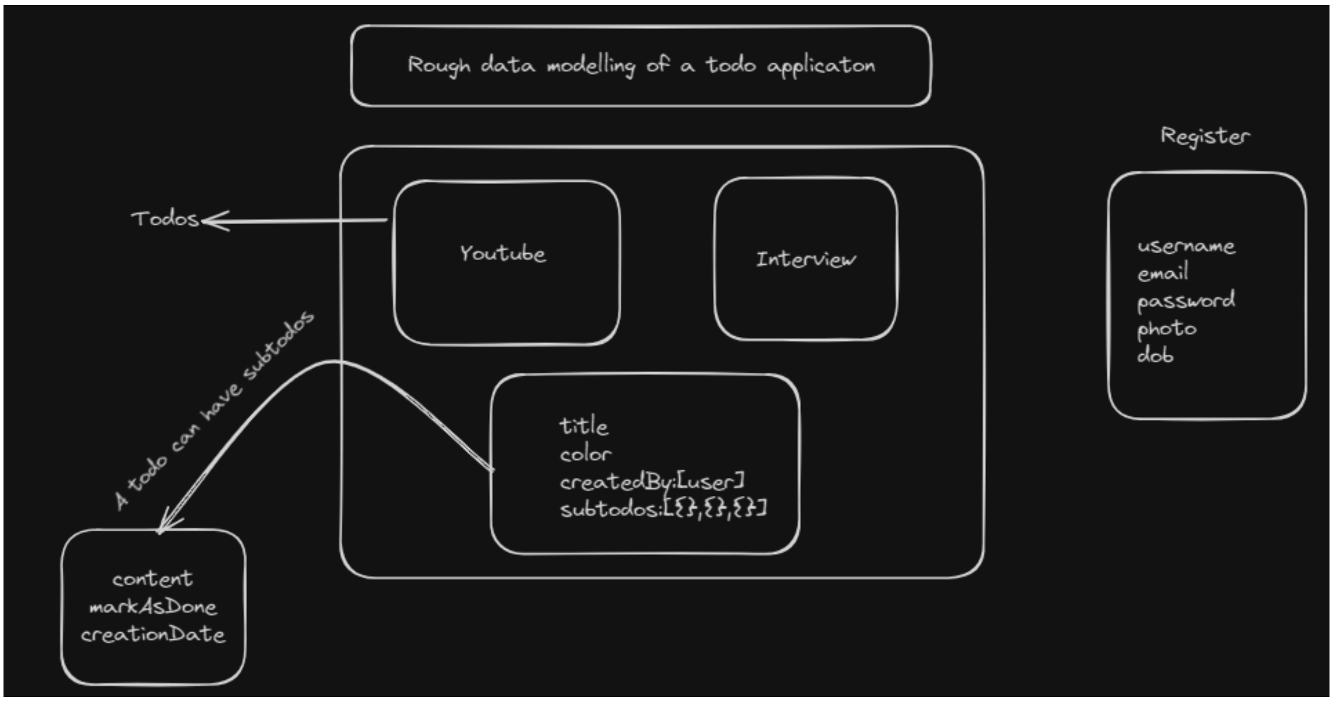
- First, it's important to have clarity about the fields, what data will be stored. Analyze it thoroughly. Then, we will decide how to do it, where to do it.

> In hindi: Sabse pehle fields ke baare me clarity rakhna hoga, kya kaya data store honge. Achhe se analyse karna hoga. Then decide karenge ki kaise karna hoga, kaha karna hoga

Tools for Data modelling

- **moon-modeler** (paid)
- **eraser.io**
- pen and paper

Example



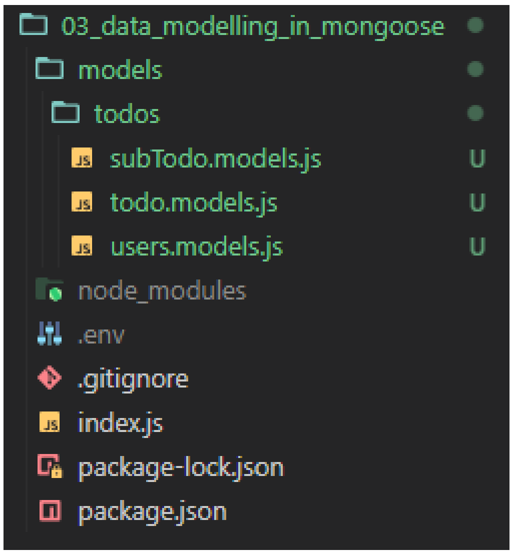
- ***So first do this object modelling in any tool or on pen an paper. Ask questions to yourself.***

Mongoose

- Mongoose is a helper library that helps in mongodb object modelling.
- Install mongoose inside your app using `npm i mongoose`

Creating models

- Directory Structure



```
03_data_modelling_in_mongoose
  models
    todos
      subTodo.models.js    U
      todo.models.js       U
      users.models.js      U
  node_modules
  .env
  .gitignore
  index.js
  package-lock.json
  package.json
```

- `filename.models.js` is a good convention.
- I am going to define user modelling. So I will go to `users.models.js`
- ***3 basic steps*** that one need to perform:
  i. Import
    - `import mongoose from 'mongoose'`
      - This line imports the Mongoose library

  ii. Create new Schema
    - `const userSchema = new mongoose.Schema({})`
      - This line creates a new instance of the mongoose.Schema class which is used to define the structure of documents that will be stored in the MongoDB collection.
      - It takes object as input.

  iii. Export the schema as model
    - `export const User = mongoose.model('User',userSchema)`
      - This line creates a Mongoose model named 'User' based on the defined schema (userSchema).
      - This function takes two arguments: the name of the model ('User' in this case) and the schema to be associated with it.
      - The export statement makes the User model available for use in other parts of your application.

```
import mongoose from 'mongoose'

const userSchema  = new mongoose.Schema({})

export const User = mongoose.model('User',userSchema)
```

`Very important points`

- Mongoose, by default, follows a naming convention when creating collections in MongoDB. It takes the singular name of the model, converts it to lowercase, and then pluralizes it to form the collection name.
- In this case, the 'User' model would result in a MongoDB collection named 'users'.
- If you were to save a document using this 'User' model, Mongoose would automatically interact with a MongoDB collection named 'users'.

  - For instance, when you perform operations like creating, querying, or updating documents using the 'User' model, Mongoose translates these actions to MongoDB queries on the 'users' collection.

> In Hindi - Import karo, Schema banao - schema me objects aayenge , export kar lo schema ko as a model mongoose.model ke andar jo '' ke within me naam denge - us naam ko mongoose lowercase aur plural bana kar collection bana dega mongodb me

- Creating fields
  - 2 ways
    - 1st way (without any property) (Not recommended)

```
    import mongoose from 'mongoose'

    const userSchema  = new mongoose.Schema(
    {
        username:String,
        email:String,
        isActive:Boolean
    }
)

    export const User = mongoose.model('User',userSchema)
```

    - 2nd Way (With properties)

```
import mongoose from 'mongoose'

const userSchema  = new mongoose.Schema(
    {
        username:{
            type:String,
            required:true,
            unique:true,
            lowercase:true
        },
        email:{
            type:String,
            require:true,
            unique:true,
            lowercase:true
        },
        password:{
            type:String,
            required:true
        }
    }
)

export const User = mongoose.model('User',userSchema)
```

- timestamps

- Mongoose schemas support a timestamps option. If you set timestamps: true, Mongoose will add two properties of type Date to your schema:
    - createdAt: a date representing when this document was created
    - updatedAt: a date representing when this document was last updated
- We can create timepass using mongoose.Schema only. Timestamps is added as a second object to the `mongoose.Schema`
- `const userSchema = new Schema({ name: String }, { timestamps: true });`

- Full Code:

```
import mongoose from 'mongoose'

const userSchema  = new mongoose.Schema(
    {
        username:{
            type:String,
            required:true,
            unique:true,
            lowercase:true
        },
        email:{
            type:String,
            require:true,
            unique:true,
            lowercase:true
        },
        password:{
            type:String,
            required:true
        }
    },
    {
        timestamps:true
    }
)

export const User = mongoose.model('User',userSchema)
```

- Establishing Relationship between different Models
  users.models.js

```
import mongoose from 'mongoose';

const userSchema = new mongoose.Schema(
{
    username: {
    type: String,
    required: true,
    unique: true,
    lowercase: true,
    },
    email: {
    type: String,
    require: true,
    unique: true,
    lowercase: true,
    },
    password: {
    type: String,
    required: true,
    },
},
{
    timestamps: true,
}
);

export const User = mongoose.model('User', userSchema);
```

subTodo.models.js

```
import mongoose from 'mongoose';

const subTodoSchema = new mongoose.Schema(
({
    content: {
    type: String,
    required: true,
    },
    complete: {
    type: Boolean,
    default: false,
    },
    createdBy: {
    type: mongoose.Schema.Types.ObjectId,
    ref: 'User',
    },
},
{ timestamps: true })
);

export const SubTodo = mongoose.model('SubTodo', subTodoSchema);
```

todo.models.js

```
import mongoose from 'mongoose';

const todoSchema = new mongoose.Schema(
{
    content: {
    type: String,
    required: true,
    },
    complete: {
    type: Boolean,
    default: false,
    },
    createdBy: {
    type: mongoose.Schema.Types.ObjectId,
    ref: 'User',
    },
    subTodos: [
    {
        type: mongoose.Schema.Types.ObjectId,
        ref: 'SubTodo',
    },
    ],
},
{
    timestamps: true,
}
);

export const Todo = mongoose.model('Todo', todoSchema);
```

- Relationships

i.

```
    createdBy: {
        type: mongoose.Schema.Types.ObjectId,
        ref: 'User',
    },
```

- This field is a reference to another document in the MongoDB database.
- `mongoose.Schema.Types.ObjectId` : It is specifying that the createdBy field will contain MongoDB ObjectIds.
- ref: 'User': It indicates that the values in the createdBy field will correspond to the _id field of documents in the 'User' collection. Essentially, it establishes a relationship between the Todo document and a User document.
- This is useful for associating a Todo with a specific user who created it. The createdBy field will contain the ObjectId of the corresponding user document.

ii.

```
    subTodos: [
    {
        type: mongoose.Schema.Types.ObjectId,
        ref: 'SubTodo',
    },
],
```

- This field is an array of references to other documents in the MongoDB database.
- `mongoose.Schema.Types.ObjectId` : Similar to createdBy, it specifies that the elements in the subTodos array will be MongoDB ObjectIds.
- ref: 'SubTodo': It indicates that the values in the subTodos array will correspond to the _id field of documents in the 'SubTodo' collection. This establishes a relationship between the Todo document and multiple SubTodo documents.
- This is useful for creating a relationship between a Todo and its associated sub-todos. The subTodos array will contain ObjectIds pointing to documents in the 'SubTodo' collection.
- These references allow you to perform population, which is a mechanism in Mongoose that lets you automatically replace the specified paths in a document with documents from other collections.