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Middleware

OUTLINE

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- What is Middleware?
- Implementation Middleware
- Echo Middleware
- Type Echo Middleware
- Implementation
  - Log Middleware
  - Auth Middleware
  - JWT Middleware

Middleware

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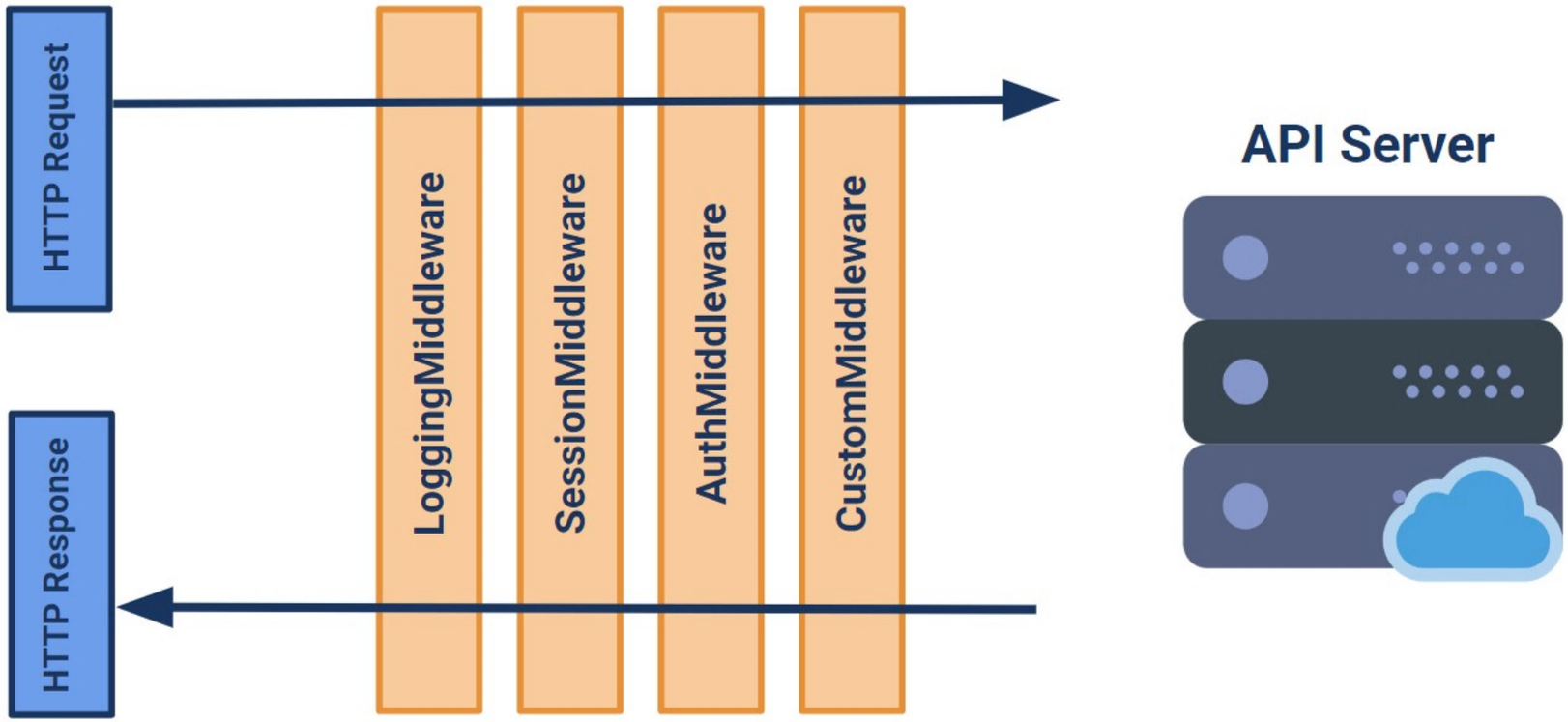
Middleware is an entity that hooks into server's request/response processing.

Middleware, allow us to implement various functionalities around incoming HTTP requests to your server and outgoing responses.

Implementation Middleware



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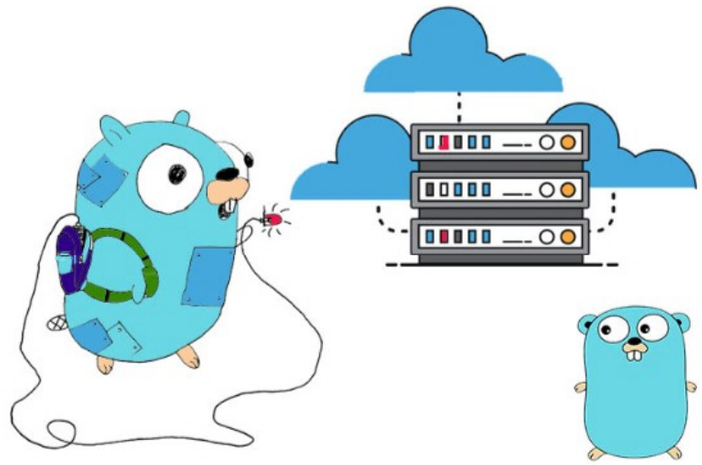
Example Third Party Middleware

- Negroni
- Echo
- Interpose
- Alice
- Or you make own?



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Middleware

- Basic Auth
- Body Dump
- Body Limit
- CORS
- CSRF
- Casbin Auth
- Gzip
- JWT
- Key Auth
- Logger
- Method Override
- Proxy
- Recover
- Redirect
- Request ID
- Rewrite
- Secure
- Session
- Static
- Trailing Slash

echo Middleware

SETUP MIDDLEWARE ECHO

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Echo#Pre()

Executed before router processes the request

- HTTPSRedirect
- HTTPSWWWRedirect
- WWWRedirect
- AddTrailingSlash
- RemoveTrailingSlash
- MethodOverride
- Rewrite

Echo#Use()

Executed after router processes the request and has full access to echo.Context API

- BodyLimit
- Logger
- Gzip
- Recover
- BasicAuth
- JWTAuth
- Secure
- CORS
- Static

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HTTPS REDIRECT

HTTPS redirect middleware redirects

http requests to https.

For example, http://labstack.com will be redirected to https://labstack.com.

middleware.go

```
e := echo.New()
e.Pre(middleware.HTTPSRedirect())
```

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Log Middleware

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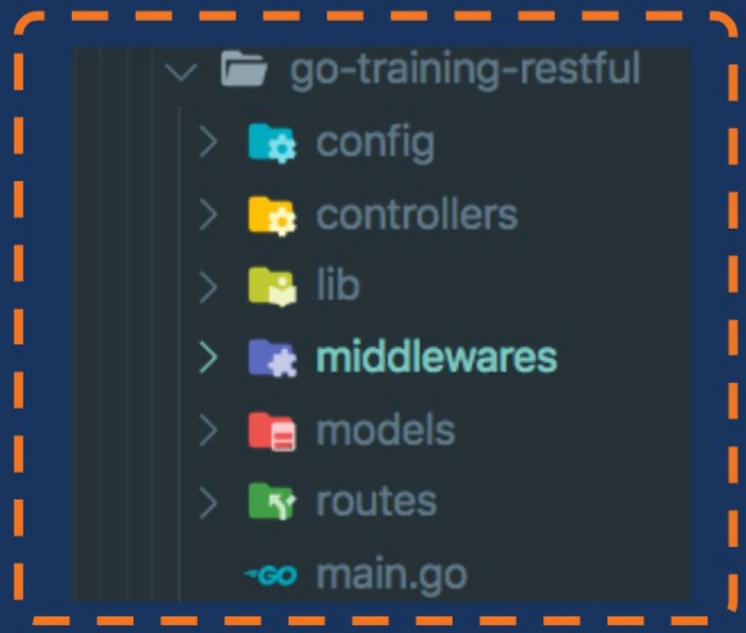
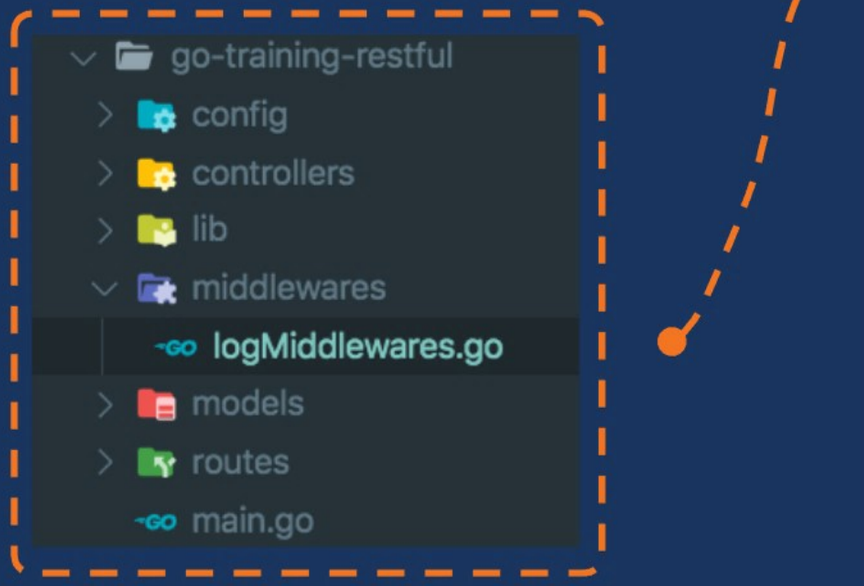
Logger Middleware

- **Logs** the information HTTP request.
- As a **footprint**.
- Datasource for **analytics**.

1 # CREATE FOLDER MIDDLEWARE



2 # CREATE
LOG MIDDLEWARE



Docs: https://echo.labstack.com/middleware/logger

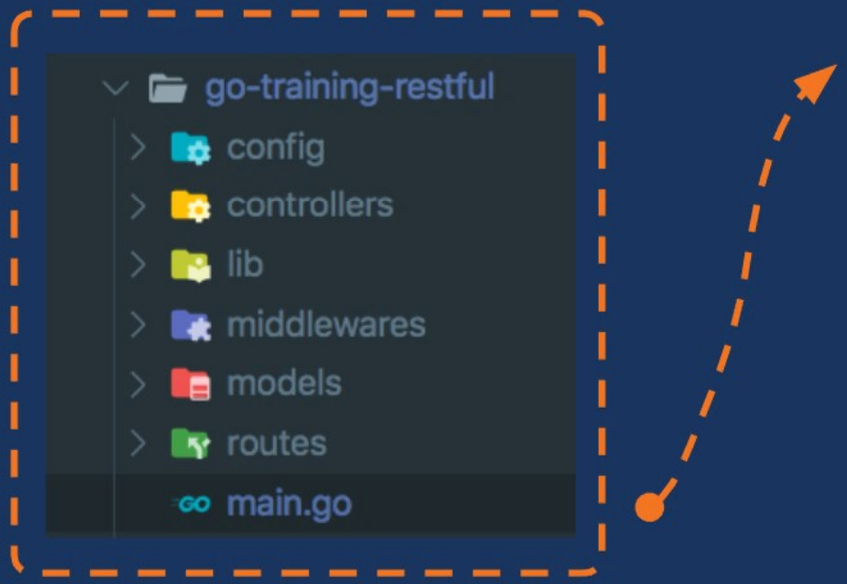
```go
package middlewares

import (
  "github.com/labstack/echo"
  "github.com/labstack/echo/middleware"
)

func LogMiddlewares(e *echo.Echo) {

e.Use(middleware.LoggerWithConfig(middleware.LoggerConfig{
    Format: `[${time_rfc3339}] ${status} ${method}
${host}${path} ${latency_human}` + "\n",
  }))
}
```

3 # IMPLEMENT MIDDLEWARE



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```go
package main

import(
  "github.com/iswanulumam/go-training-restful/routes"
  m "github.com/iswanulumam/go-training-restful/middleware
)

func main() {
  e := routes.New()
  // implement middleware logger
  m.LogMiddlewares(e)
  // start the server, and log if it fails
  e.Logger.Fatal(e.Start(":8000"))
}
```

4 # Result

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```
PROBLEMS 8   OUTPUT   DEBUG CONSOLE   TERMINAL                    1: go

   ____    __
  / __/___/ /  ___
 / _// __/ _ \/ _ \
/___/\__/_//_/\___/ v4.1.6
High performance, minimalist Go web framework
https://echo.labstack.com
____________________________________O/_______
                                    O\
⇨ http server started on [::]:8000
[2019-07-25T09:47:33+07:00] 404 GET localhost:8000/user 64.75µs
[2019-07-25T09:47:39+07:00] 404 GET localhost:8000/hello 31.747µs
[2019-07-25T09:47:56+07:00] 200 GET localhost:8000/users 755.539µs
[2019-07-25T09:47:57+07:00] 200 GET localhost:8000/users 704.589µs
```

Result of implementation **logger middleware**

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Auth Middleware

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WHY USING AUTHENTICATION

- User Identification
- Secure Data and Information

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Authentication Middleware

Basic Authentication

JSON Web Token

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WHAT IS BASIC AUTHENTICATION?

Basic Auth is an http authentication technique request, this method requires username and password information to be inserted in the request header.

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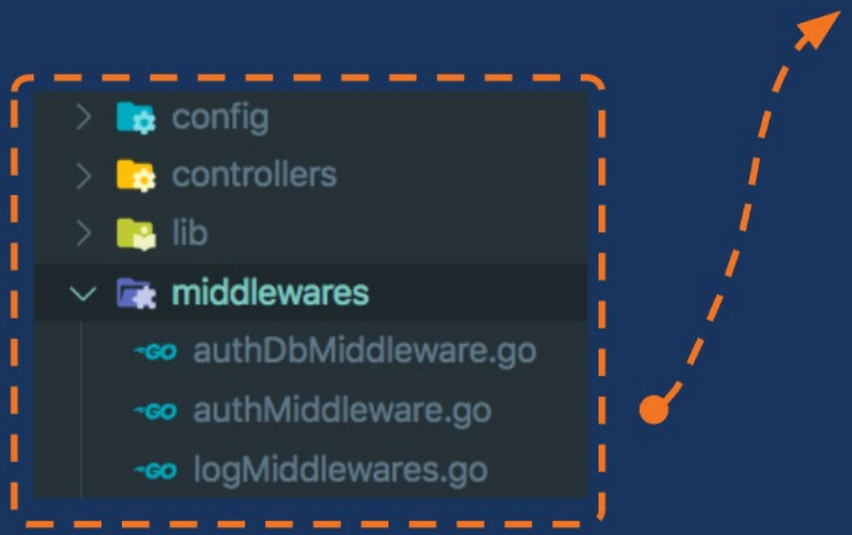
Information Encoded Format :

```
'Authorization: Basic ' +
base64encode('username:password')
```

Header Generate :

```
Authorization: Basic dXNlcm5hbWU6cGFzc3dvcmQ=
```

1 # CREATE
AUTH MIDDLEWARE



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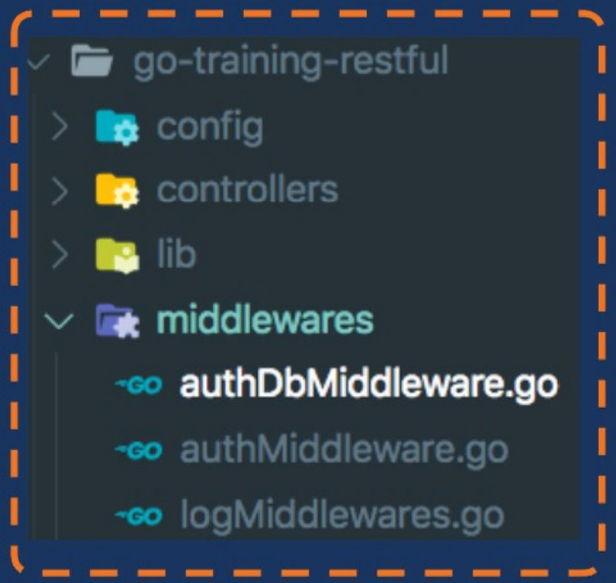
```go
func BasicAuth(username, password string, c echo.Context)
(bool, error) {
  if username == "admin" && password == "admin" {
    return true, nil
  }
  return false, nil
}
```

3 # CREATE
AUTH MIDDLEWARE (DB)



Docs: https://echo.labstack.com/middleware/logger

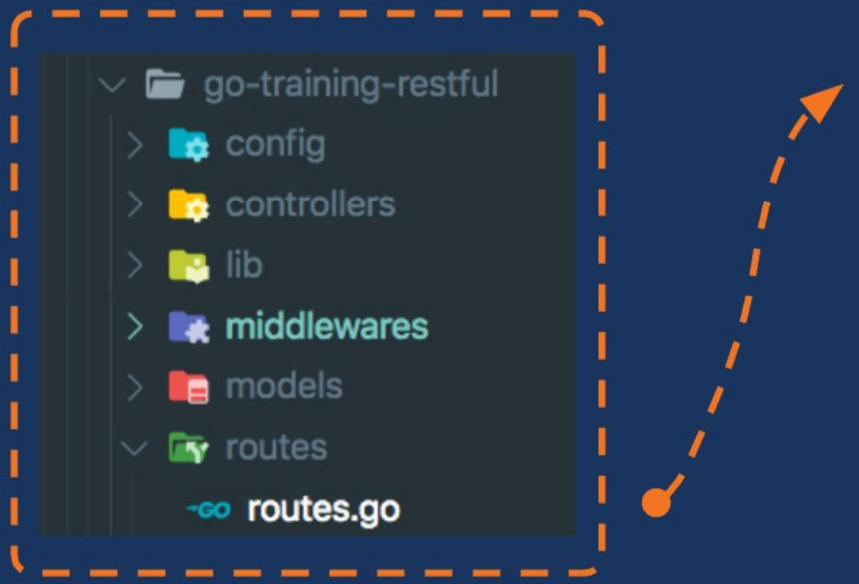
```go
package middlewares

import(
  "github.com/labstack/echo"
  "github.com/iswanulumam/go-training-restful/config"
  "github.com/iswanulumam/go-training-restful/models"
)

var db = config.DB

func BasicAuthDB(username, password string, c
echo.Context) (bool, error) {
  var db = config.DB
  var user models.User
  if err := db.Where("email = ? AND password = ?",
username, password).First(&user).Error; err != nil {
    return false, nil
  }
  return true, nil
}
```

2 # IMPLEMENT MIDDLEWARE



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```go
package routes

import (
  c "github.com/iswanulumam/go-training-restful/controllers"
  m "github.com/iswanulumam/go-training-restful/middlewares"

  echoMid "github.com/labstack/echo/middleware"
  "github.com/labstack/echo"
)

func New() *echo.Echo {
  e := echo.New()

  e.GET("/users", c.GetUsersController)
  e.GET("/users/:id", c.GetUserController)
  e.POST("/users", c.CreateUserController)

  // implement middleware with group routing
  eAuth := e.Group("")
  eAuth.Use(echoMid.BasicAuth(m.BasicAuthDB))

  eAuth.DELETE("/users/:id", c.DeleteUserController)
  eAuth.PUT("/users/:id", c.UpdateUserController)

  return e
}
```

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JWT Middleware

Encoded PASTE A TOKEN HERE

```
eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.ey
JzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSI6Ikpva
G4gRG9lIiwiaWF0IjoxNTE2MjM5MDIyfQ.SflKx
wRJSMeKKF2QT4fwpMeJf36POk6yJV_adQssw5c
```

Decoded EDIT THE PAYLOAD AND SECRET

HEADER: ALGORITHM & TOKEN TYPE

```
{
  "alg": "HS256",
  "typ": "JWT"
}
```

PAYLOAD: DATA

```
{
  "sub": "1234567890",
  "name": "John Doe",
  "iat": 1516239022
}
```

VERIFY SIGNATURE

```
HMACSHA256(
  base64UrlEncode(header) + "." +
  base64UrlEncode(payload),
  your-256-bit-secret
) ☐ secret base64 encoded
```

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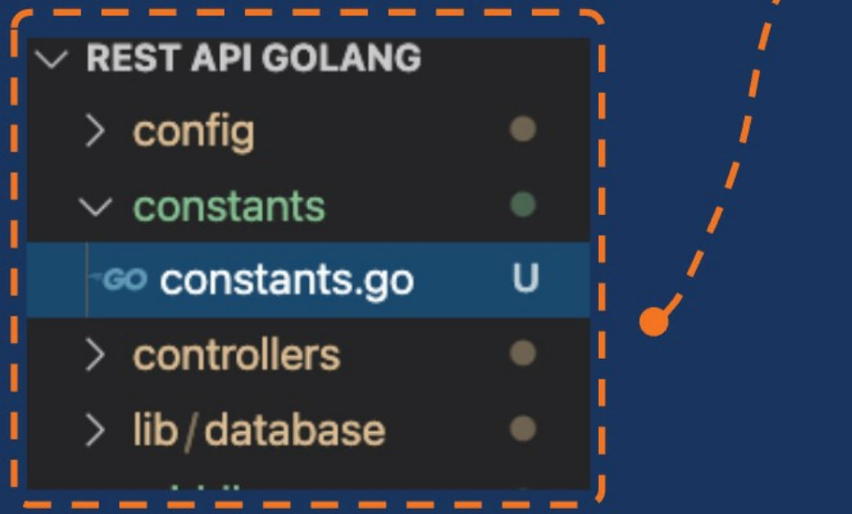
Information Encoded Format :

`'Authorization: Bearer + Token`

Header Generate :

```
Authorization: Bearer
eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJhdXRob3J
pemVkIjp0cnVlLCJleHAiOjE2MTQwNzU3NDMsInVzZXJJZCI
6MX0.3RGYBl7pwh7J86Cmhcp78AMi3LU-10_Wuu5Rt098vCk
```

1 # CREATE CONSTANTS




```go
package constants

const SECRET_JWT = "legal"
```

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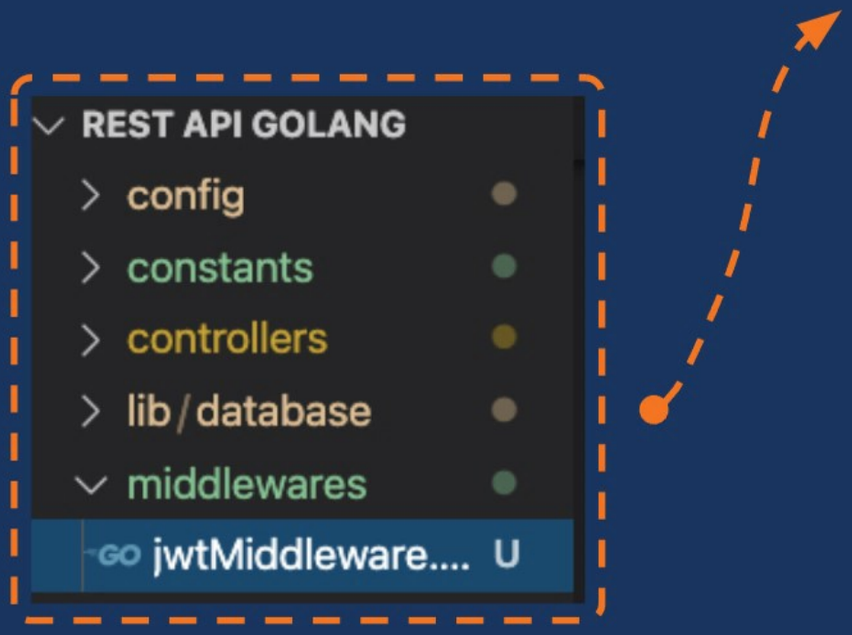
2 # CREATE
JWT MIDDLEWARE



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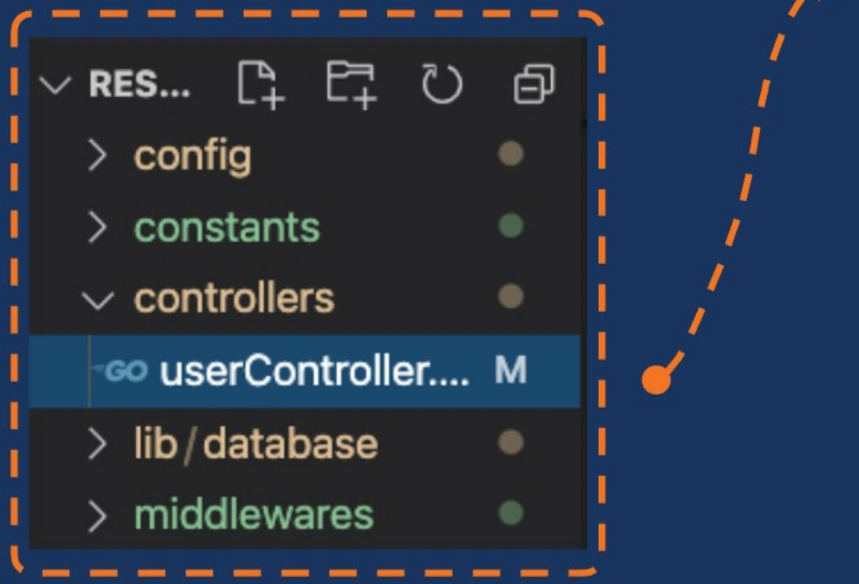
```go
package middlewares

import (
    "project/constants"
    "time"

    jwt "github.com/dgrijalva/jwt-go"
    "github.com/labstack/echo"
)

func CreateToken(userId int) (string, error) {
    claims := jwt.MapClaims{}
    claims["authorized"] = true
    claims["userId"] = userId
    claims["exp"] = time.Now().Add(time.Hour * 1).Unix() //Token
expires after 1 hour
    token := jwt.NewWithClaims(jwt.SigningMethodHS256, claims)
    return token.SignedString([]byte(constants.SECRET_JWT))

}

func ExtractTokenUserId(e echo.Context) int {
    user := e.Get("user").(*jwt.Token)
    if user.Valid {
        claims := user.Claims.(jwt.MapClaims)
        userId := claims["userId"].(int)
        return userId
    }
    return 0
}
```

3 # IMPLEMENT
LOGIN CONTROLLER



Docs:

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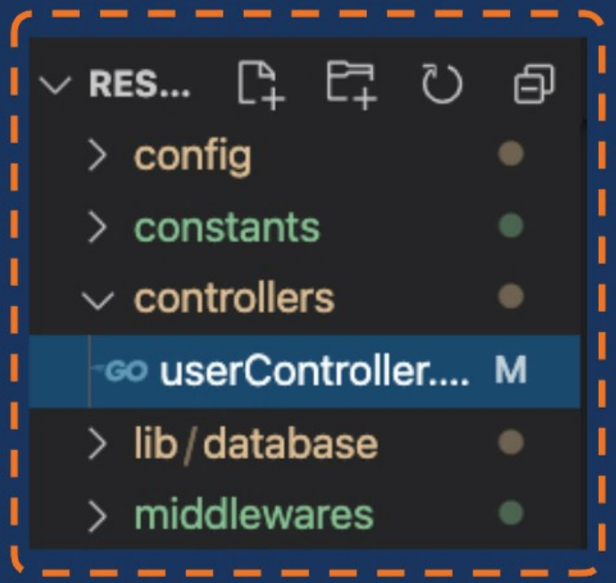
```
...
func LoginUsersController(c echo.Context) error {
   user := models.Users{}
   c.Bind(&user)

   users, e := database.LoginUsers(&user)
   if e != nil {
       return echo.NewHTTPError(http.StatusBadRequest,
e.Error())
   }
   return c.JSON(http.StatusOK, map[string]interface{}{
       "status": "success login",
       "users":  users,
   })
}


...
```

4 # IMPLEMENT

DETAIL CONTROLLER #2



Docs:

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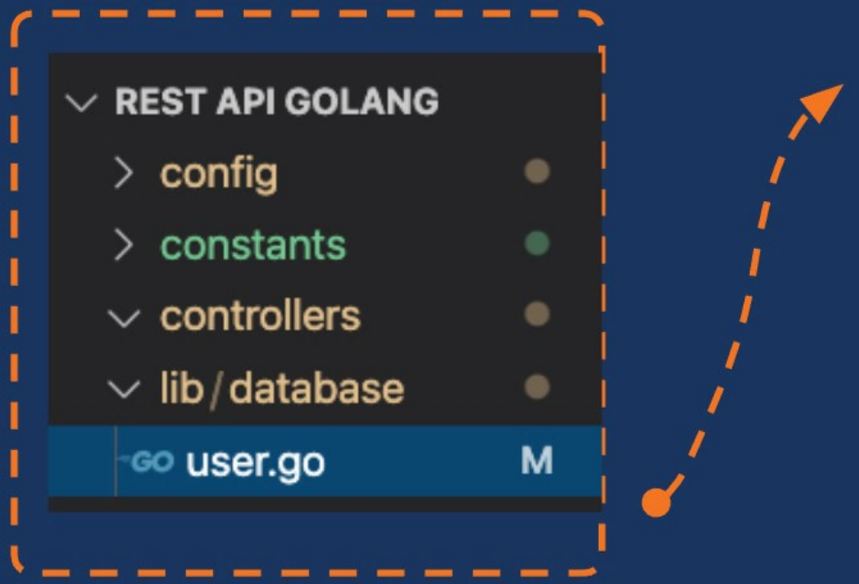
```
...

func GetUserDetailControllers(c echo.Context) error {
   id, err := strconv.Atoi(c.Param("id"))

   if err != nil {
       return echo.NewHTTPError(http.StatusBadRequest,
err.Error())
   }

   users, err := database.GetDetailUsers((id))

   if err != nil {
       return echo.NewHTTPError(http.StatusBadRequest,
err.Error())
   }

   return c.JSON(http.StatusOK, map[string]interface{}{
       "status": "success",
       "users":  users,
   })
}


...
```

5 # IMPLEMENT
LIB DATABASE



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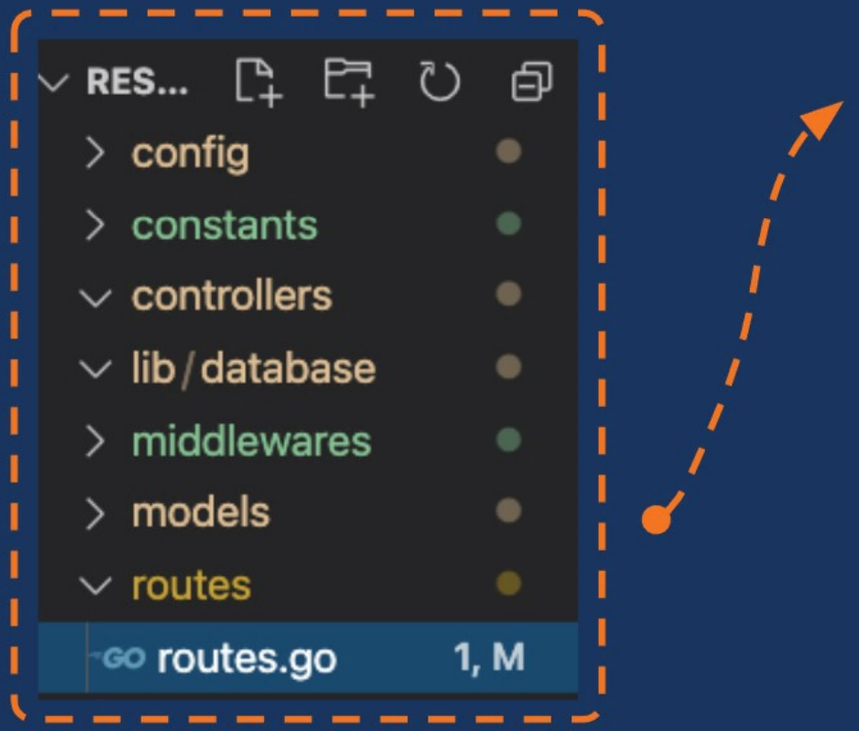
```go
func GetDetailUsers(userId int) (interface{}, error) {
    var user models.Users

    if e := config.DB.Find(&user, userId).Error; e != nil {
        return nil, e
    }
    return user, nil
}

func LoginUsers(user *models.Users) (interface{}, error) {

    var err error
    if err = config.DB.Where("email = ? AND password = ?",
user.Email, user.Password).First(user).Error; err != nil {
        return nil, err
    }

    user.Token, err = middlewares.CreateToken(int(user.ID))
    if err != nil {
        return nil, err
    }

    if err := config.DB.Save(user).Error; err != nil {
        return nil, err
    }

    return user, nil
}
```

6 # IMPLEMENT ROUTE



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```go
func New() *echo.Echo {
    e := echo.New()

    e.GET("/users", controllers.GetUserControllers)
    e.GET("/users/:id", controllers.GetUserDetailControllers)
    e.POST("/users", controllers.CreateUsersController)
    e.POST("/login", controllers.LoginUsersController)

    // JWT Group
    r := e.Group("/jwt")
    r.Use(middleware.JWT([]byte(constants.SECRET_JWT)))
    r.GET("/users/:id", controllers.GetUserDetailControllers)

    return e
}
```

.end

RESTful API