Technology used:

Django
https://www.djangoproject.com/

What it accomplishes:

A. Establishing TCP server
B. Handling HTTP requests
C. Building web pages
D. HTTP responses and HTML templating

How it accomplishes the above:

A. By default, the runserver command starts the development server on the internal IP at port 8000.
    - The runserver command is accessed from the *manage.py* file generated when a django project is created. (A django project is created through running the "django-admin startproject <filename>" command).
        - The project is generated through *management/templates.py*
        - To run the server, one needs to type into the terminal "python manage.py runserver" or "python3 manage.py runserver". *manage.py* commands are facilitated through the *management/base.py* file.
    - *runserver.py* sets up the TCP socket server and specifies the port to connect to. Receiving of request data is facilitated through the *ServerHandler* class in *basehttp.py*, where buffering and request data recording is handled through the *LimitedStream* class in *handlers/wsgi.py*

B. Any request to the Django application is checked in the urls.py file and the pattern for the requested url is matched.

    - If the URL is found in the file a corresponding function to the same URL is rendered and the execution goes to the controller (views.py). The method is then executed and a response is generated which can be a simple HTTP response or any HTML template.
    - In case the URL is not matched, it creates a not found error which will redirect to a 404 page.
    - *basehttp.py* holds the *WSGIRequestHandler* class which parses the HTTP request header

C. In Django, each page is facilitated by separate folders within the directory. For example, the login page is facilitated by the “login” folder. The main folder that coordinates the pages is called *django_project*, which has references to all the page folders.
    - These folders are created through django’s *handle()* method in *startapp.py*, which uses functions from management/*templates.py* to create a folder of a specified name with a migrations folder, *admin.py*, *apps.py*, *models.py*, *tests.py*, *urls.py*, and *views.py*.
        - *startapp.py*
        - *management/templates.py*
    - The paths that lead to these pages are specified in the *django_project* folder in *settings.py* in the list called *INSTALLED_APPS*. Each page folder has an *apps.py*, where a config class is contained. A string referencing the config class is what is added to *INSTALLED_APPS*.
    - In the *django_project* folder, there is also a python file called *urls.py*, which links specific paths to each page folder’s respective *urls.py*.
        - In a page folder’s *urls.py*, it looks at any possible paths, and executes a function depending on the path. The functions that are executed are located in the page folder’s *views.py*. Usually, these functions serve the purpose of rendering the page.
    - A rendered HTTP response is sent with django’s *render()* function in *shortcuts.py*. Refer to D to see how the function works.

D. The HTTP response is built with django’s *render()* function. The return value of *render()* is used as the response. *render()* would be called in various functions within a page folder’s *views.py*. For our purposes, we put in three arguments within *render()*. The first argument is the HTTP request sent by the client, the second argument is the HTML file we want to render, and the third argument is any data that needs to be rendered in the HTML file through templating.
    - The *render()* function in *shortcuts.py* first creates the body by calling *render_to_string()* within *loader.py*, which gets the specific templating engine used in *engine.py*. Within *engine.py*, string parsing of the HTML template is done through functions within *template/base.py*.
    - After the body is done, the body is passed into *HTTPResponse()* within *response.py* to prepend the header to the body.
    - The HTML templating uses a similar template language to Jinja. In the HTML file, text in double braces {{ }} signals a variable. Text within {% %} signifies a code block (such as a loop or conditional). And each block has an end block notification to signify the end of a code block (Example: for loops in {% endfor %}).
        - For lists and dictionaries, keys and indexes use dot notation (Example: dict.word for finding the value of the key “word” in the dictionary “dict”; list.0 for finding the element at index 0).

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