CMT120 Coursework2

Digital Portfolio Report

- **C21114732**
- URL of my website on OpenShift server: http://c-21114732-cmt-120-cw-2-git-c21114732-cmt120-cw22.apps.openshift.cs.cf.ac.uk

Security

Digitalization also brings in security concerns. In my project, digital portfolio, I have included two important features:

1. Session based authentication

Library: flask-login
Method: @login_manager, UserMixin

Under the blog section of my project, I have included a session based authentication. In case, the user wants to add a comment on a blogpost, they would have to first signup/login in order to comment. This session will be saved until they decide to logout.

Login manager uses a session to determine if you are logged in or not. So, when the user returns to their computer and goes back to this website, it checks the session, to authenticate whether the user is logged in or not. @login_manager uses a session to store the unique identifier (ID) of the user that is logged in.

I used UserMixin because we are going to be using plugin flask_login, which allows us to easily log users in and out. The main user class needs to inherit this from flask_login. UserMixin class provides the implementation of some of flask-login properties like: is_authenticated to check if login credentials provided is correct or not instead of having to write a method to do that.

Extended security:
Flask-login has an is_authenticated() method that returns True if the user has provided valid credentials

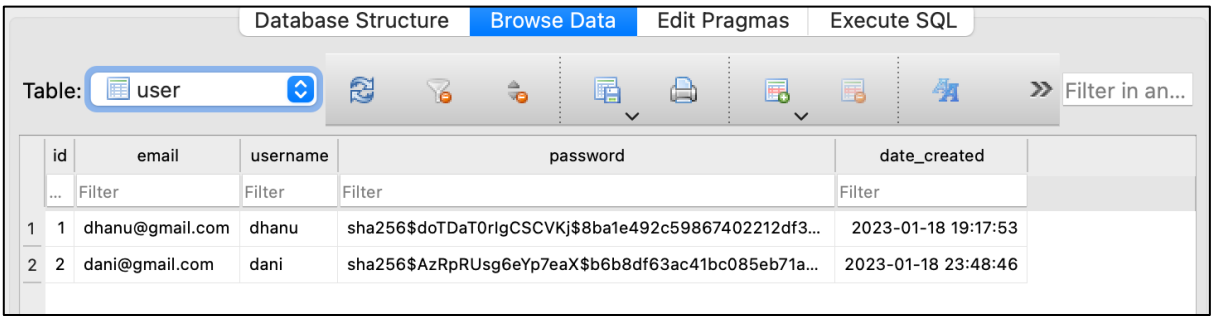
References:
Flask-Login. Available at:
https://flask-login.readthedocs.io/en/latest/
(Accessed on: 19 January 2023)

2. Password hashing

Library: werkzeug.security
Method: werkzeug.security.**generate_password_hash**

To extend security to the website with regard to its passwords, we use the werkzeug.security library. Hash function allows password to be stored in an encoded format, so that the plain password text isn't visible. Hash function is essentially a function where you cannot compute the inverse, there is no known inverse for this function. Therefore, getting the text from hash is impossible, which in turn heightens security. Currently our modern day encryption uses hash in most security systems.

This how hash works:
Password -> hash it -> hash



User Database

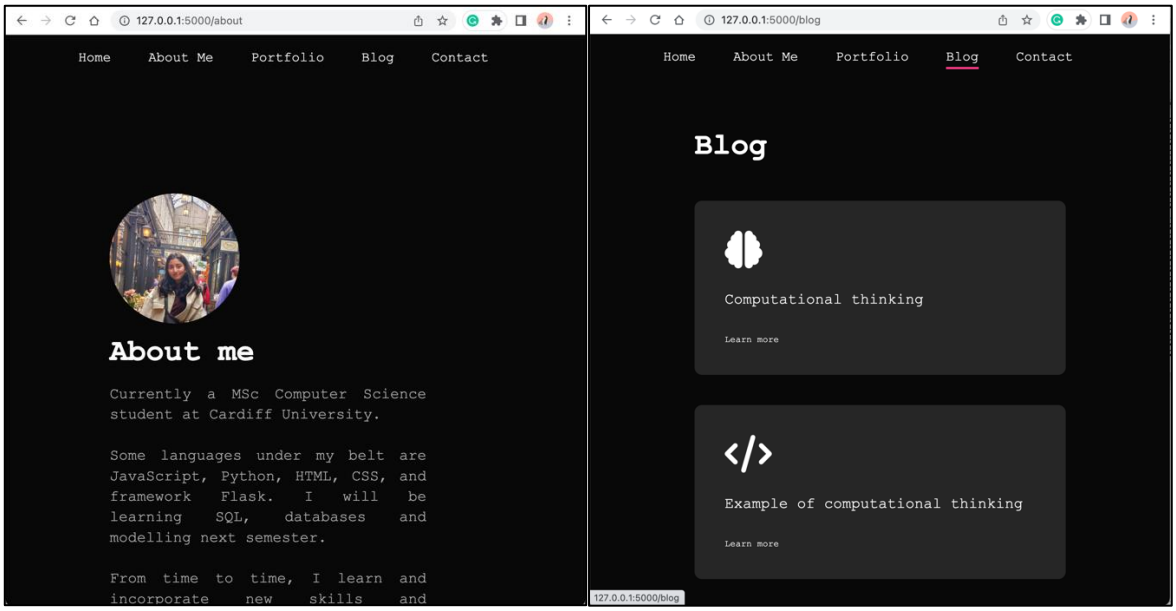
If the password and hash are equal, the user successfully logs in.

Extended security:
While signing up, the user has to meet the password security requirements. The website checks for existing email, existing username, password length greater than 6 characters and email length greater than 4 characters.

References:
Pallets. (2007) 'Werkzeug Utilities'. Available at: https://werkzeug.palletsprojects.com/en/2.2.x/utils/#module-werkzeug.security (Accessed on: 19 January 2023)

Usability

1. **Responsive Design**
   The website is responsive, making it more accessible and user friendly to a wider range of visitors. Majority of online traffic is coming from mobile users with desktop a close second, therefore it is always better to adapt website content according to different devices.
   Here is an example of the digital portfolio customized to a smaller screen:



2. A 'Contact Me' form to enhance user interaction

Library: Flask-Mail

Implementation of flask-mail increases user interaction. Users can directly connect with the website's owner by sending them a message through 'Contact-me' form. Flask-mail on this website is set up with SMTP server by google. The credentials passed on to the code includes the Gmail username along with its app password. App password allows secure handling of the account when used by other applications.

3. Creating a clean look/ Website Usability

Website Usability increases website traffic and makes it easier to scan or read through the content on a nonlinear basis. These include proper use of font size and color, along with readable font.

- The design elements used in this project:
  Website Primary colors: Black (hex #080808)/ Bright Pink(hex #F43C83)
  Font: 'Courier New', *Courier*, *monospace*
  Icons: FontAwsome Kit

- Website is created to implement a 'dark-mode', pertaining to benefit users' visual needs.
- High user interaction by using flask method Flash, allows smooth user experience

4. Links as action items

The digital portfolio includes portfolio work along with useful links to connect with the owner of the website.

As this website is a portfolio describing skills, talents and projects, the work displayed on the portfolio redirects to the project pages on GitHub. And in order to reach out to the person directly, there are links redirecting to LinkedIn and GitHub on the 'Contact-Me' page.

References:

J. Neilson(11-05-2002) 'Top 10 Guidelines for Homepage Usability' Available at: https://www.nngroup.com/articles/top-ten-guidelines-for-homepage-usability/ (Accessed on: 19 January 2023)

S. Idler(30-09-2021), '5 Key Principles Of Good Website Usability' Available at: https://www.crazyegg.com/blog/principles-website-usability/ (Accessed on: 19 January 2023)

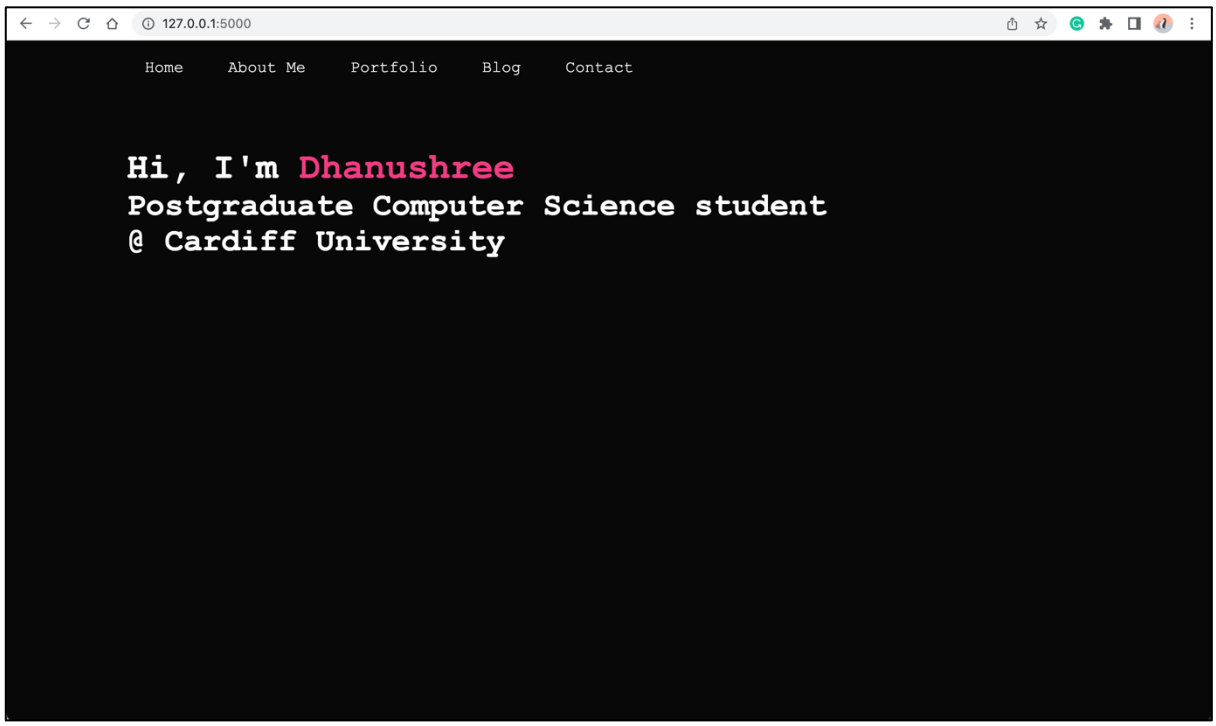
Appendix A:

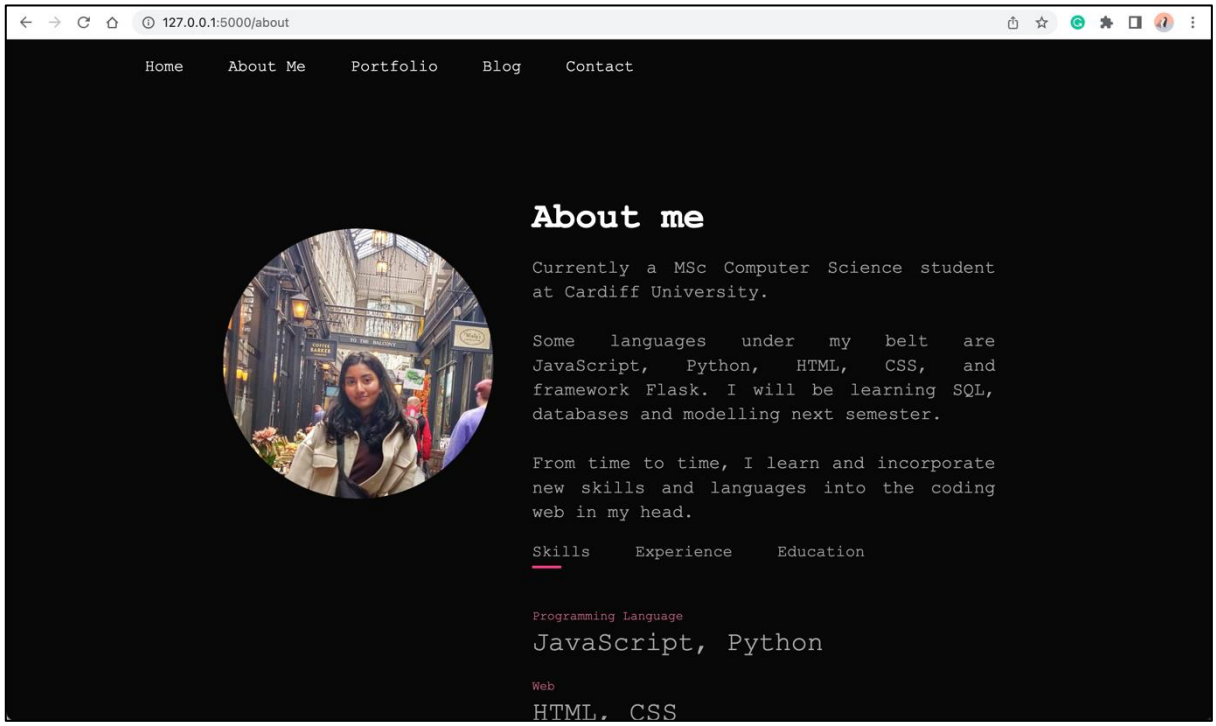
List of advanced functionality implemented

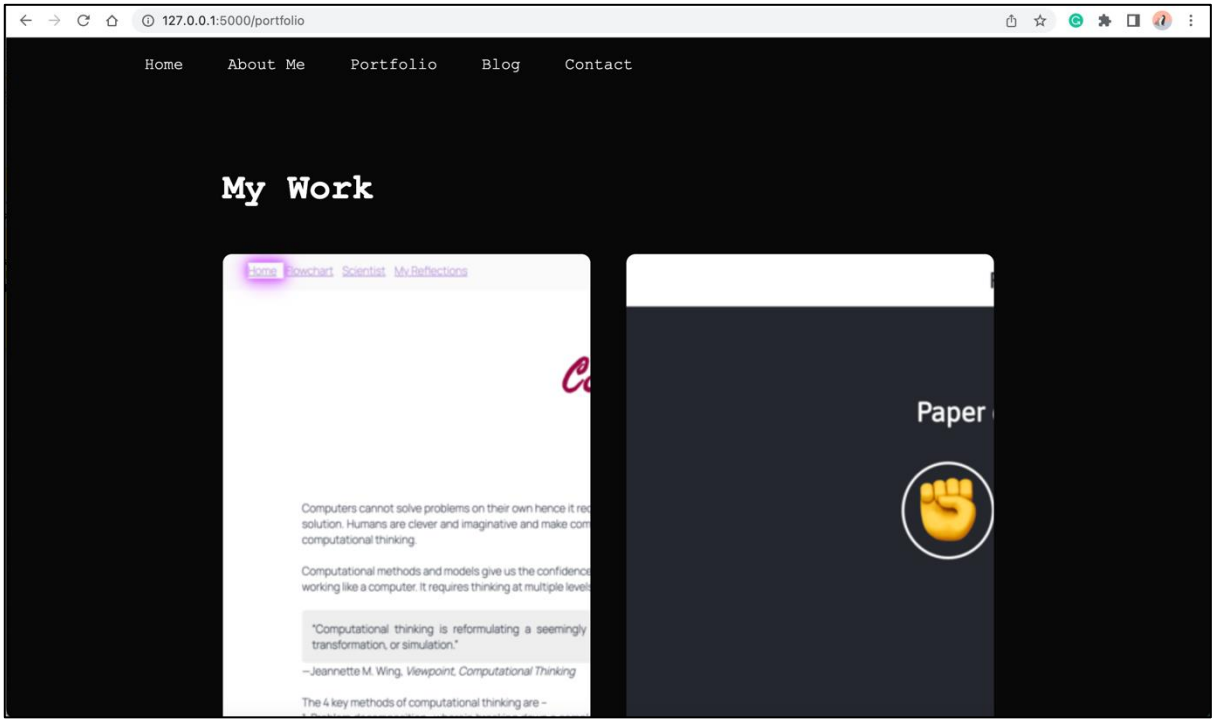
S no.	Functionality	Use
1.	Flask-Mail	Flask mail sets up a simple interface between SMTP server and the flask application to send messages. SMTP Server used: Google server.
2.	Flash method in flask	Using this to denote any changes occurring to the website system.
3.	Flask-SQLAlchemy	Used in order to interact with databases in flask application
4.	SQLite	Database storing User details and Posts
5.	Download	Downloading files using the Download attribute – CV file

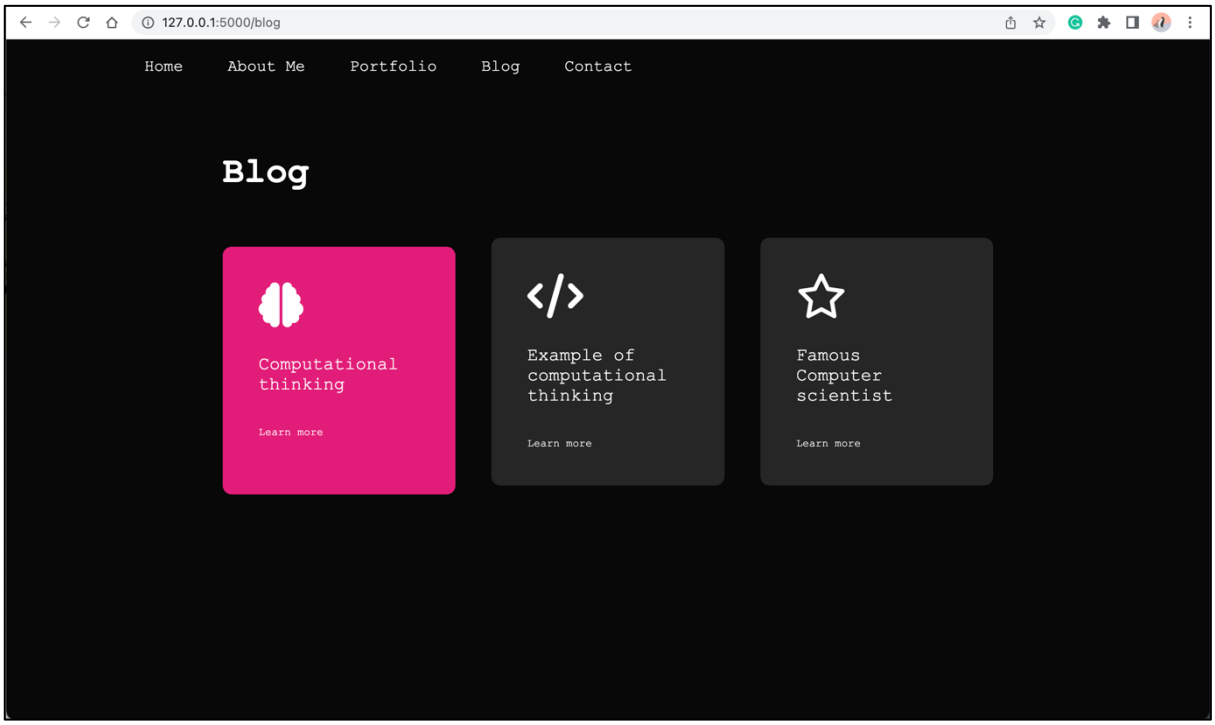
Appendix B:

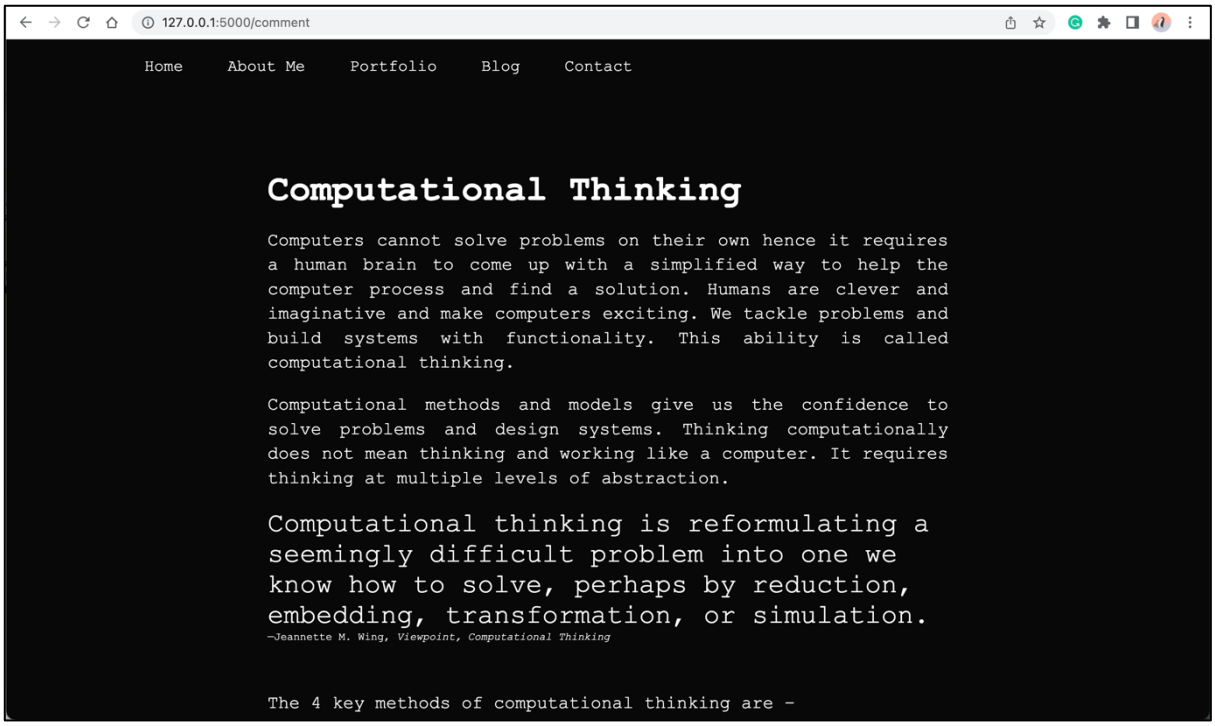
Screenshots of Digital Portfolio's webpages.

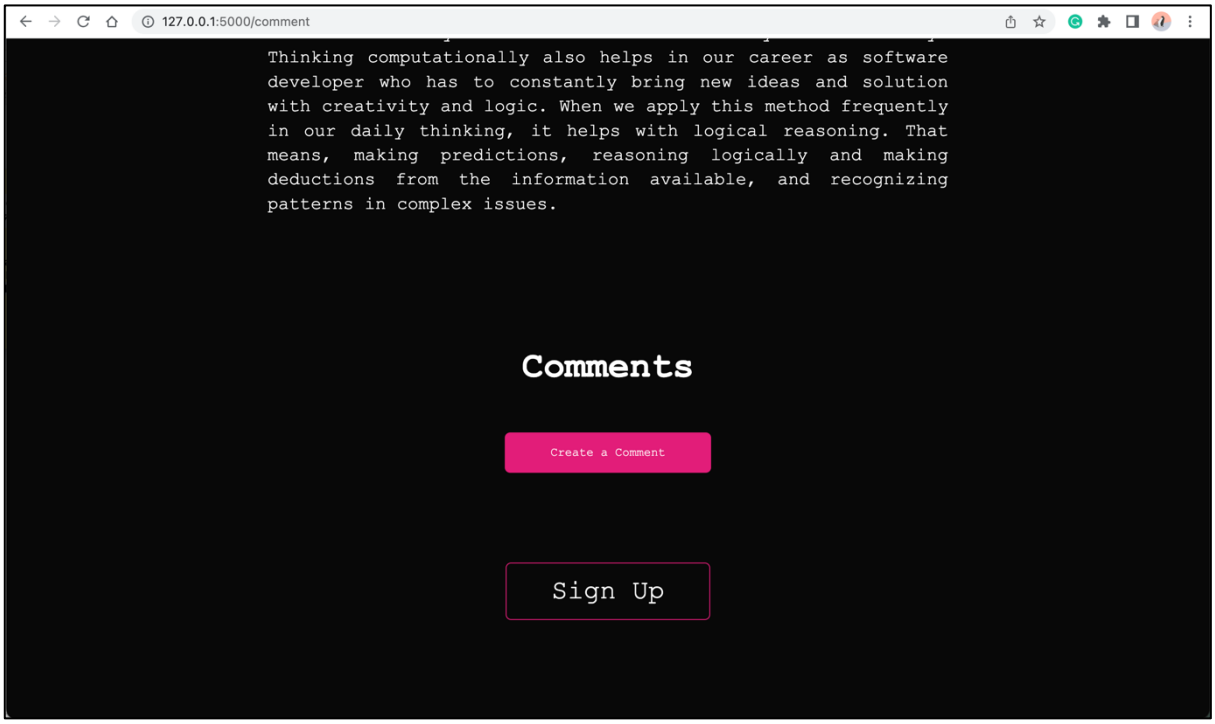


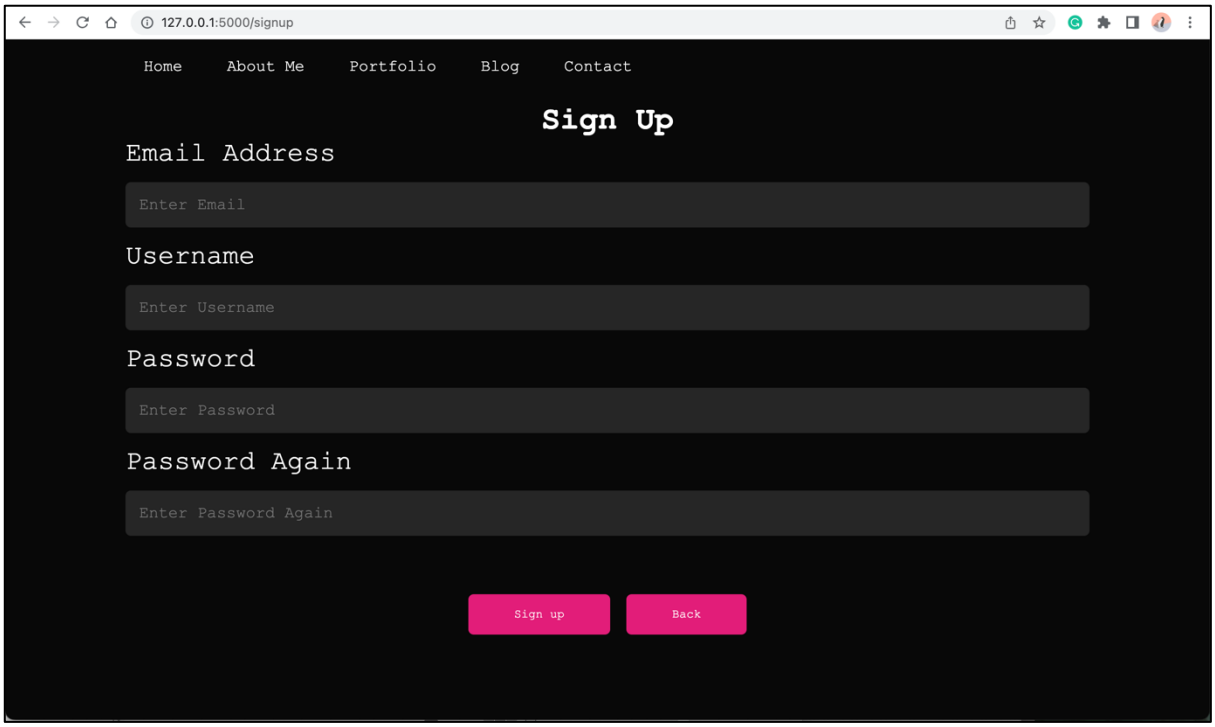



127.0.0.1:5000/portfolio
Home
About Me
Portfolio
Blog
Contact
My Work
Home
Flowchart
Scientist
My Reflections
Computers cannot solve problems on their own hence it
solution. Humans are clever and imaginative and make
computational thinking.
Computational methods and models give us the confidence
working like a computer. It requires thinking at multiple
"Computational thinking is reformulating a seemingly
transformation, or simulation."
–Jeannette M. Wing, Viewpoint, Computational Thinking
The 4 key methods of computational thinking are –
Paper


127.0.0.1:5000/blog
Home
About Me
Portfolio
Blog
Contact
Blog
Computational thinking
Learn more
Example of computational thinking
Learn more
Famous Computer scientist
Learn more


127.0.0.1:5000/comment
Home
About Me
Portfolio
Blog
Contact
Computational Thinking
Computers cannot solve problems on their own hence it requires a human brain to come up with a simplified way to help the computer process and find a solution. Humans are clever and imaginative and make computers exciting. We tackle problems and build systems with functionality. This ability is called computational thinking.
Computational methods and models give us the confidence to solve problems and design systems. Thinking computationally does not mean thinking and working like a computer. It requires thinking at multiple levels of abstraction.
Computational thinking is reformulating a seemingly difficult problem into one we know how to solve, perhaps by reduction, embedding, transformation, or simulation.
—Jeannette M. Wing, Viewpoint, Computational Thinking
The 4 key methods of computational thinking are -


127.0.0.1:5000/comment
Thinking computationally also helps in our career as software developer who has to constantly bring new ideas and solution with creativity and logic. When we apply this method frequently in our daily thinking, it helps with logical reasoning. That means, making predictions, reasoning logically and making deductions from the information available, and recognizing patterns in complex issues.
Comments
Create a Comment
Sign Up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Home
About Me
Portfolio
Blog
Contact
Sign Up
Email Address
Enter Email
Username
Enter Username
Password
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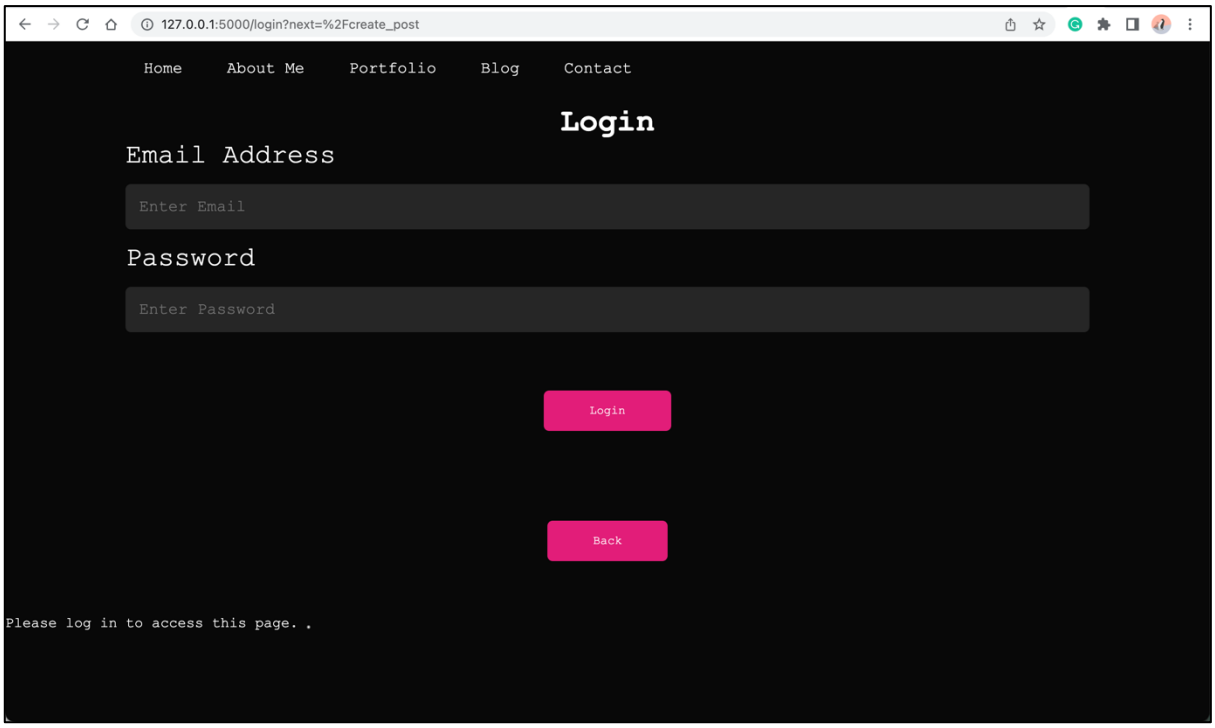
Password Again
Enter Password Again
Sign up
Back


127.0.0.1:5000/login?next=%2Fcreate_post
Home
About Me
Portfolio
Blog
Contact
Login
Email Address
Enter Email
Password
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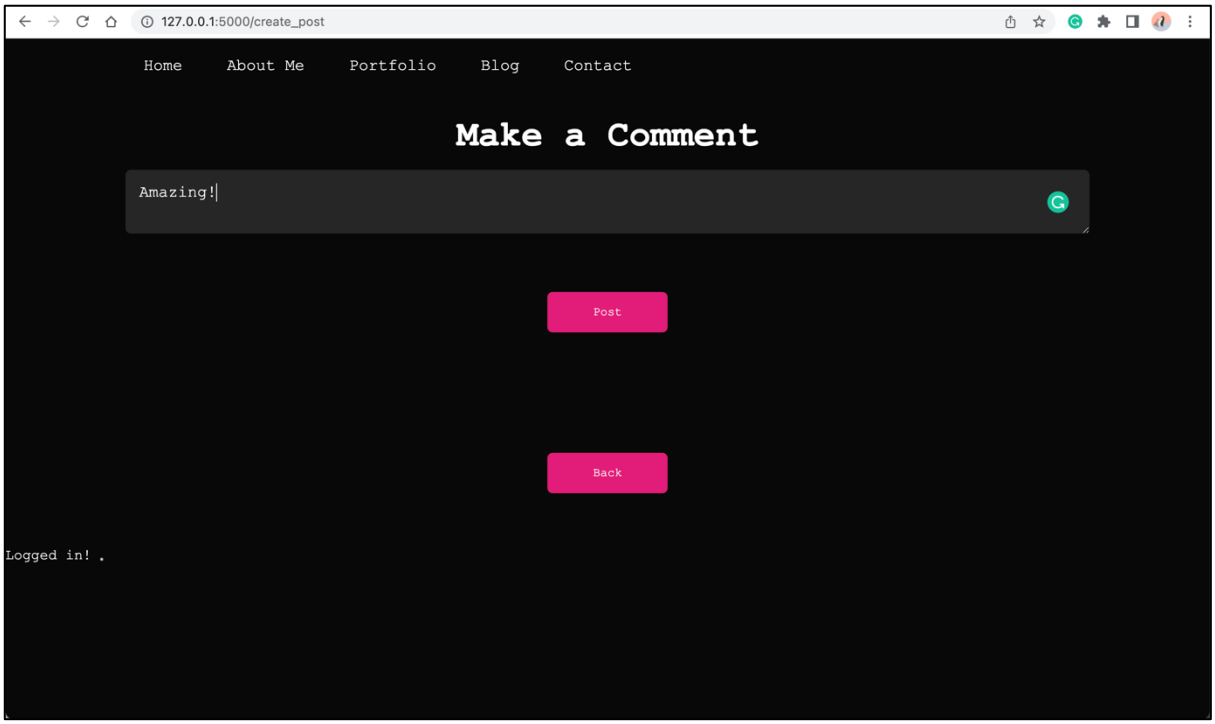
Login
Back
Please log in to access this page. .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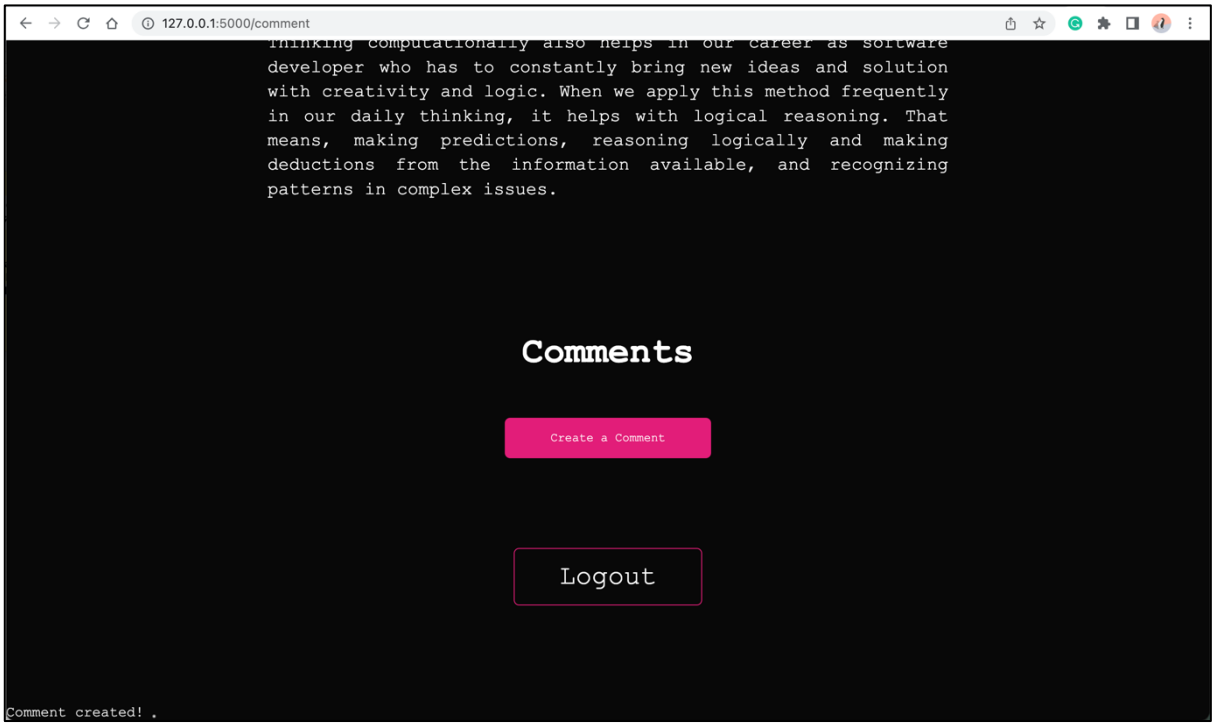
Home
About Me
Portfolio
Blog
Contact
Make a Comment
Amazing!
Post
Back
Logged in! .


127.0.0.1:5000/comment
developer who has to constantly bring new ideas and solution
with creativity and logic. When we apply this method frequently
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means, making predictions, reasoning logically and making
deductions from the information available, and recognizing
patterns in complex issues.
Comments
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Comment created! .

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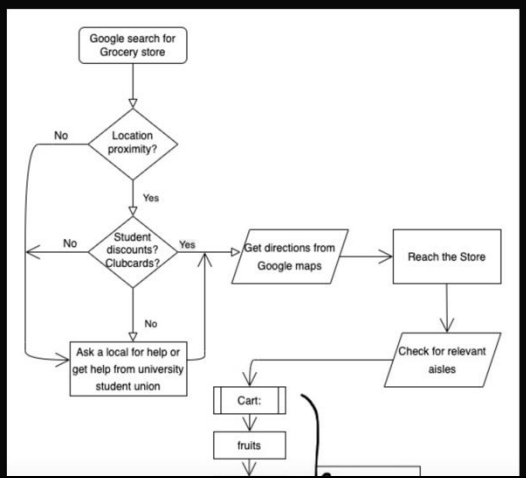
Flowchart explaining Computational thinking



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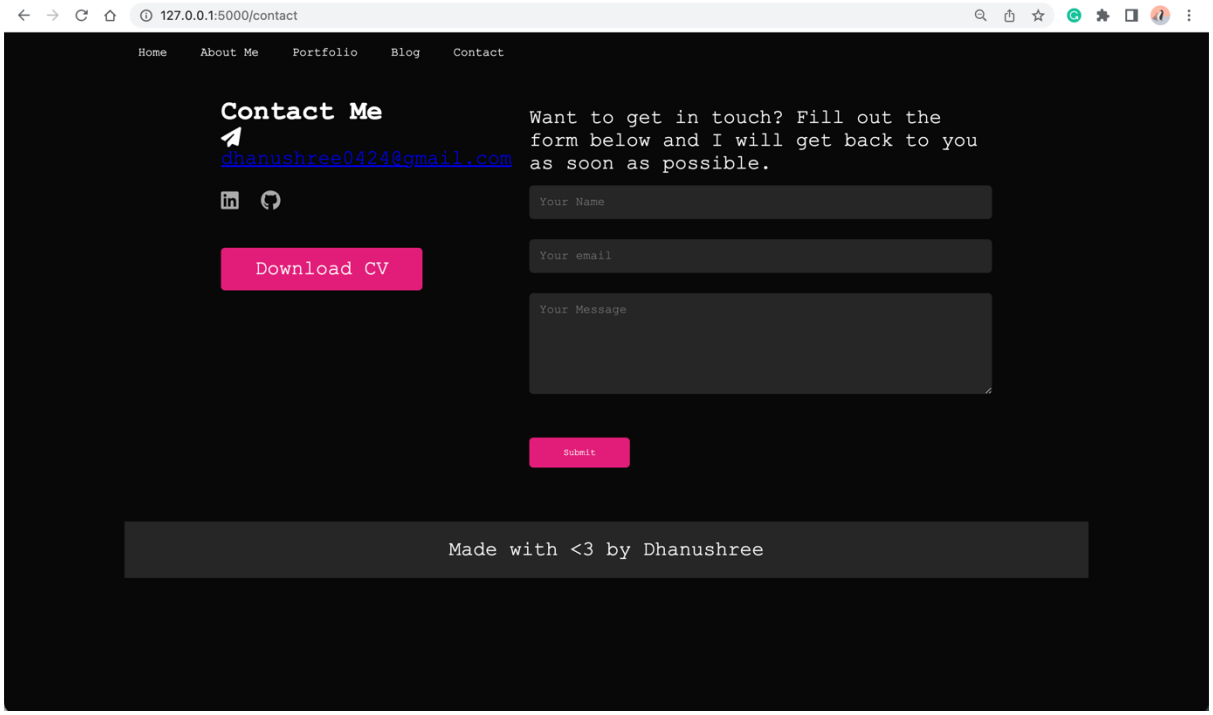
Sophie Wilson

Overnight Success Takes 30 years.
—Sophie Wilson

Introduction

Sophie Wilson is a computer scientist who designed the architecture of BBC micro which won Acorn to sign a contract with BBC. She gave the ARM microprocessor an instruction set (RISC- Reduced instruction set computer) which is now found in almost half of the world's consumer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Your Message
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