Lab 5-8-2024

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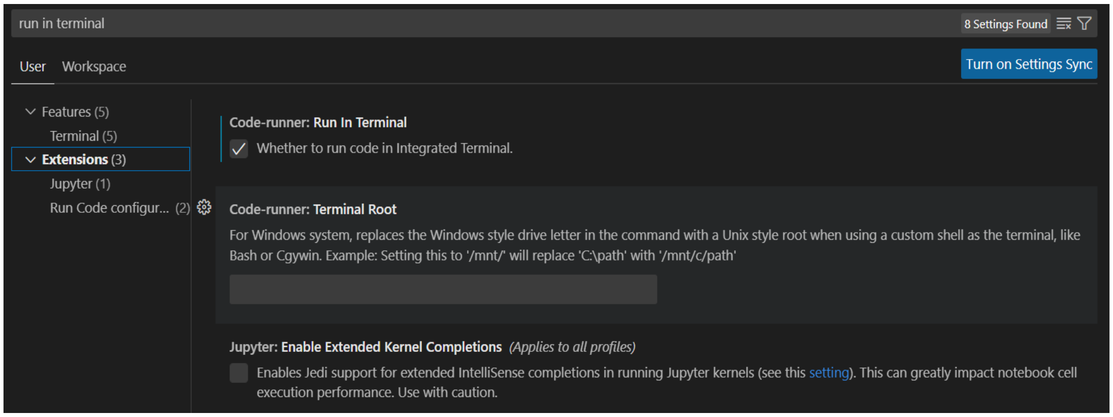
1. Download and install python. You can use the following link:
   https://www.python.org/downloads/
2. Install VS Code. Please follow the instructions below for installation.
   a. Download VS Code for your desired operating system using following link.
      https://code.visualstudio.com/download
   b. Follow the installation process as per instructions.
   c. Press Ctrl+Shift+X or go to the extensions tab (icon looking like this ⊞). Install the “code runner” extension.
   d. Create a new folder and a new file. You can do that by pressing these Icons respectively 🗀,🗋. Name the file in file_name.py format.
   e. Lastly, go to setting in bottom left corner or press (Ctrl + ,). Search for “run in terminal” in the search bar above.



run in terminal

8 Settings Found

User Workspace

Turn on Settings Sync

Features (5)
Terminal (5)
Extensions (3)
Jupyter (1)
Run Code configur... (2)

Code-runner: Run In Terminal

☑ Whether to run code in Integrated Terminal.

Code-runner: Terminal Root

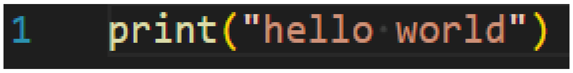
For Windows system, replaces the Windows style drive letter in the command with a Unix style root when using a custom shell as the terminal, like Bash or Cgywin. Example: Setting this to '/mnt/' will replace 'C:\path' with '/mnt/c/path'

Jupyter: Enable Extended Kernel Completions *(Applies to all profiles)*

☐ Enables Jedi support for extended IntelliSense completions in running Jupyter kernels (see this setting). This can greatly impact notebook cell execution performance. Use with caution.

Make sure that Run in Terminal checkbox has been checked.

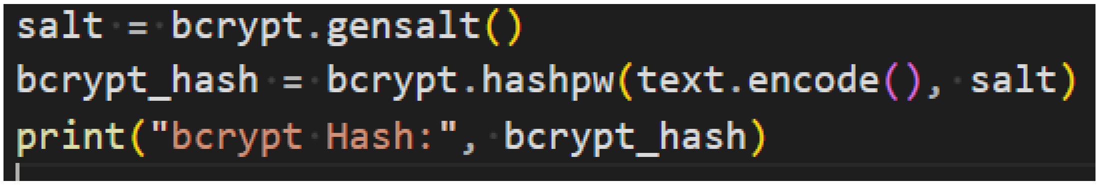
3. Write your first code as print ("hello world")



```
print("hello world")
```

if it runs then you are good to go.

4. Now, for the first task you need to write a piece of code in python (or any language of your choice given that you can import hash libraries in it). In this piece of code, you will:
   a. Import hashlib and bcrypt libraries. For bcrypt use command "pip install bcrypt".
   b. Take your name as an input string.
   c. Convert your name string to bytes using function text.encode(). Here "text" is the input string of your name.
   d. Generate MD5, SHA-1, SHA-256, SHA512, SHA-3, BLAKE2, bcrypt and RIPEMD-160 hashes of your name string.
   e. For bcrypt you can use the following piece of code:

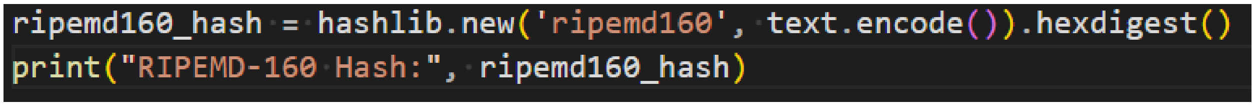


```
salt = bcrypt.gensalt()
bcrypt_hash = bcrypt.hashpw(text.encode(), salt)
print("bcrypt Hash:", bcrypt_hash)
```

- In the code above, bcrypt.gensalt(): Generates a salt using the bcrypt hashing algorithm and assigns it to the variable salt. Where "salt" is a random value that is used as an additional input during the hashing process to make it more secure like a nonce.

- bcrypt_hash = bcrypt.hashpw(text.encode(), salt): Generates the bcrypt hash of a text string using the provided salt and assigns it to the variable bcrypt_hash. Here “text” is the input string of your name.
- print("bcrypt Hash:", bcrypt_hash): Prints the string "bcrypt Hash:" followed by the value of bcrypt_hash.

f. For RIPEMD-160 you can use this:



```
ripemd160_hash = hashlib.new('ripemd160', text.encode()).hexdigest()
print("RIPEMD-160 Hash:", ripemd160_hash)
```

- Here hashlib.new('ripemd160', text.encode()) creates a new hash object for the RIPEMD-160 algorithm.
- hashlib is a built-in Python module for hashing algorithms.
- 'ripemd160' specifies the specific hashing algorithm to use, in this case, RIPEMD-160.
- text.encode() converts the string to bytes using the default encoding (UTF-8) since hash functions typically operate on bytes rather than strings.
- hexdigest() is a method that returns the hexadecimal representation of the calculated hash.
- The resulting hash value is assigned to the variable ripemd160_hash.
- And print just prints it out as discussed in the case of bcrypt hash.

5. Please repeat the above task taking the whole article of your choice from any newspaper. Personally I like this one "https://thefinancialexpress.com.bd/views/reviews/silicon-valley-banks-collapse-what-happened-and-why-it-matters".
6. Use the same code above and observe the "avalanche effect" by changing any value in the input string of the article.