GRIFFITH COLLEGE DUBLIN

Assignment Cover Sheet

Student name:	**Divine Eboigbe**		
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Faculty:	**Computing Science**		
Course:	**BSCH**	**Stage/year:**	
Subject:	**BSCH-ET**		
Study Mode:	Full time **x**	Part-time	
Lecturer Name:	**Osama Abushama**		
Assignment Title:	**Web IDE Final Project**		
No. of pages:			
Disk included?	Yes	No	
Additional Information:	(ie. number of pieces submitted, size of assignment, A2, A3 etc)		
Date due:	**10th May, 2024**		
Date submitted:	**09th May, 2024**		

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Signed: _____ **Date:** _____

Please note: *Students **MUST** retain a hard / soft copy of **ALL** assignments as well as a receipt issued and signed by a member of Faculty as proof of submission.*

Building and pushing the c compiler

```
(base) PS C:\Users\ogbed\OneDrive\Desktop\ET_WebIDE\Backend\c_compiler> docker build -t apexplayground/c_compiler:latest .
[+] Building 0.0s (0/0)  docker:default
[+] Building 43.7s (11/11) FINISHED
 => [internal] load build definition from Dockerfile
 => => transferring dockerfile: 268B
 => [internal] load metadata for docker.io/library/python:3.9-slim
 => [auth] library/python:pull token for registry-1.docker.io
 => [internal] load .dockerignore
 => => transferring context: 2B
 => CACHED [1/5] FROM docker.io/library/python:3.9-slim@sha256:44122e46edb1c3ae2a144778db3e01c78b6de3af20ddcc38d43032decffb00cf
 => [internal] load build context
 => => transferring context: 3.86kB
 => [2/5] RUN apt-get update && apt-get install -y gcc
 => [3/5] WORKDIR /app
 => [4/5] COPY . /app
 => [5/5] RUN pip install --no-cache-dir -r requirements.txt
 => exporting to image
 => => exporting layers
 => => writing image sha256:2f1fd3dee2a7c249368a3bc281baafc5d8de9e99b5289fea600a8aba60ea3e4a
 => => naming to docker.io/apexplayground/c_compiler:latest

View build details: docker-desktop://dashboard/build/default/default/wk7b4hgx2hnjhshonbufhx8o6

What's Next?
  View a summary of image vulnerabilities and recommendations → docker scout quickview
(base) PS C:\Users\ogbed\OneDrive\Desktop\ET_WebIDE\Backend\c_compiler>
```

```
(base) PS C:\Users\ogbed\OneDrive\Desktop\ET_WebIDE\Backend\c_compiler> docker push apexplayground/c_compiler:latest
The push refers to repository [docker.io/apexplayground/c_compiler]
c61360d1462f: Pushed
85d5871d36cd: Pushed
ca0921d7c16d: Pushed
d26acca579a0: Pushed
4fae8d5765e1: Layer already exists
19bf713f869b: Layer already exists
039d8c7e112d: Layer already exists
7a75d57a5024: Layer already exists
52ec5a4316fa: Layer already exists
latest: digest: sha256:b9390d4e38462ffa242b9ecd889ccef4d51b2d42274c79c3d7ddb26bcd1ad5f0 size: 2208
(base) PS C:\Users\ogbed\OneDrive\Desktop\ET_WebIDE\Backend\c_compiler>
```

Building and pushing the Java compiler

```
(base) PS C:\Users\ogbed\OneDrive\Desktop\ET_WebIDE\Backend\java_compiler> docker build -t apexplayground/java_compiler:latest .
[+] Building 0.0s (0/0)  docker:default
[+] Building 58.1s (10/10) FINISHED
 => [internal] load build definition from Dockerfile
 => => transferring dockerfile: 288B
 => [internal] load metadata for docker.io/library/python:3.9-slim
 => [internal] load .dockerignore
 => => transferring context: 2B
 => CACHED [1/5] FROM docker.io/library/python:3.9-slim@sha256:44122e46edb1c3ae2a144778db3e01c78b6de3af20ddcc38d43032decffb00cf
 => [internal] load build context
 => => transferring context: 481B
 => [2/5] RUN apt-get update && apt-get install -y openjdk-17-jdk-headless
 => [3/5] WORKDIR /app
 => [4/5] COPY . /app
 => [5/5] RUN pip install --no-cache-dir -r requirements.txt
 => exporting to image
 => => exporting layers
 => => writing image sha256:be5e7e0e61b25262108c60322c295b85c6922f4c1dbbef783b4bc7e3e57a2331
 => => naming to docker.io/apexplayground/java_compiler:latest

View build details: docker-desktop://dashboard/build/default/default/k5qdrdajdcrcv3y7bfbnxmlqw

What's Next?
  View a summary of image vulnerabilities and recommendations → docker scout quickview
(base) PS C:\Users\ogbed\OneDrive\Desktop\ET_WebIDE\Backend\java_compiler>
```

```
(base) PS C:\Users\ogbed\OneDrive\Desktop\ET_WebIDE\Backend\java_compiler> docker push apexplayground/java_compiler:latest
The push refers to repository [docker.io/apexplayground/java_compiler]
97ffdea6fa36: Pushed
1890c5e66eea: Pushed
161adfdc82eb: Pushed
a5b9bc82a0ba: Pushed
4fae8d5765e1: Layer already exists
19bf713f869b: Layer already exists
039d8c7e112d: Layer already exists
7a75d57a5024: Layer already exists
52ec5a4316fa: Layer already exists
latest: digest: sha256:13f5ed410ec2a992503813132faa7051ca03326c606c7032266e207b60674ae8 size: 2208
(base) PS C:\Users\ogbed\OneDrive\Desktop\ET_WebIDE\Backend\java_compiler>
```

Building and pushing the Python compiler

```
(base) PS C:\Users\ogbed\OneDrive\Desktop\ET_WebIDE\Backend\python_compiler> docker build -t apexplayground/python_compiler:latest .
 [+] Building 0.0s (0/0)  docker:default
 [+] Building 1.4s (11/11) FINISHED
  => [internal] load build definition from Dockerfile
  => => transferring dockerfile: 299B
  => [internal] load metadata for docker.io/library/python:3.9-slim
  => [auth] library/python:pull token for registry-1.docker.io
  => [internal] load .dockerignore
  => => transferring context: 2B
  => [1/5] FROM docker.io/library/python:3.9-slim@sha256:44122e46edb1c3ae2a144778db3e01c78b6de3af20ddcc38d43032decffb00cf
  => [internal] load build context
  => => transferring context: 2.35kB
  => CACHED [2/5] WORKDIR /app
  => CACHED [3/5] COPY requirements.txt ./
  => CACHED [4/5] RUN pip install --no-cache-dir -r requirements.txt
  => [5/5] COPY . /app
  => exporting to image
  => => exporting layers
  => => writing image sha256:1dd2ff06cf9c4ccdd65bc152d1077da75f96b10e6d9e68e4117974b891bee1cd
  => => naming to docker.io/apexplayground/python_compiler:latest

 View build details: docker-desktop://dashboard/build/default/default/1dwekcxe4xd97sgag4v297hhl

 What's Next?
   View a summary of image vulnerabilities and recommendations → docker scout quickview
(base) PS C:\Users\ogbed\OneDrive\Desktop\ET_WebIDE\Backend\python_compiler>
```

```
(base) PS C:\Users\ogbed\OneDrive\Desktop\ET_WebIDE\Backend\python_compiler> docker push apexplayground/python_compiler:latest
The push refers to repository [docker.io/apexplayground/python_compiler]
be2ebebabed7: Pushed
a1645ab8f3cf: Layer already exists
1a1cadb84921: Layer already exists
cb37303b8d8f: Layer already exists
4fae8d5765e1: Layer already exists
19bf713f869b: Layer already exists
039d8c7e112d: Layer already exists
7a75d57a5024: Layer already exists
52ec5a4316fa: Layer already exists
latest: digest: sha256:e03fc83c10b45e37c3f4f4b23ca07923e92d7a2a53072a6191423460c42c77a2 size: 2202
(base) PS C:\Users\ogbed\OneDrive\Desktop\ET_WebIDE\Backend\python_compiler>
```

Frontend

```
(base) PS C:\Users\ogbed\OneDrive\Desktop\ET_WebIDE\Frontend> docker build -t apexplayground/frontend:latest .
 [+] Building 0.0s (0/0)  docker:default
 [+] Building 7.8s (9/9) FINISHED
  => [internal] load build definition from Dockerfile
  => => transferring dockerfile: 188B
  => [internal] load metadata for docker.io/library/nginx:alpine
  => [auth] library/nginx:pull token for registry-1.docker.io
  => [internal] load .dockerignore
  => => transferring context: 2B
  => [1/3] FROM docker.io/library/nginx:alpine@sha256:516475cc129da42866742567714ddc681e5eed7b9ee0b9e9c015e464b4221a00
  => => resolve docker.io/library/nginx:alpine@sha256:516475cc129da42866742567714ddc681e5eed7b9ee0b9e9c015e464b4221a00
  => => sha256:501d84f5d06487ff81e506134dc922ed4fd2080d5521eb5b6ee4054fa17d15c4 10.80kB / 10.80kB
  => => sha256:fc21a1d387f514f53589abea6d67cd6b329dfd3c9059bc96a552af3b3c97b413 3.99MB / 3.99MB
  => => sha256:e6ef242c157026935bf8a69e6cf19f8f6635e44507c813daf0cc644f2e22396b 629B / 629B
  => => sha256:13fcfbc94648785b918ecc1af675ac5187cdfc30f4fdaf9afa8bd2e9dedf548b 954B / 954B
  => => sha256:516475cc129da42866742567714ddc681e5eed7b9ee0b9e9c015e464b4221a00 9.07kB / 9.07kB
  => => sha256:721fa00bc549df26b3e67cc558ff176112d4ba69847537766f3c28e171d180e7 2.50kB / 2.50kB
  => => sha256:d4bca490e609acaaf54ca73363442d31a31fd136a47a20a12370cf2025f0a10b 393B / 393B
  => => sha256:5406ed7b06d9a94b5bd15843d2a1c7e38796a3ec5dc7f40f16f70cc1d045f453 1.21kB / 1.21kB
  => => sha256:8a3742a9529dc5c00974dfcf5e465be9f1606ff8a1911527b3928cf86ad57465 1.40kB / 1.40kB
  => => sha256:0d0c16747d2c6b6c26c064652afcb964c15f1b1e596ec052b2aa19b83948ae27 13.04MB / 13.04MB
  => => extracting sha256:fc21a1d387f514f53589abea6d67cd6b329dfd3c9059bc96a552af3b3c97b413
  => => extracting sha256:e6ef242c157026935bf8a69e6cf19f8f6635e44507c813daf0cc644f2e22396b
  => => extracting sha256:13fcfbc94648785b918ecc1af675ac5187cdfc30f4fdaf9afa8bd2e9dedf548b
  => => extracting sha256:d4bca490e609acaaf54ca73363442d31a31fd136a47a20a12370cf2025f0a10b
  => => extracting sha256:5406ed7b06d9a94b5bd15843d2a1c7e38796a3ec5dc7f40f16f70cc1d045f453
  => => extracting sha256:8a3742a9529dc5c00974dfcf5e465be9f1606ff8a1911527b3928cf86ad57465
  => => extracting sha256:0d0c16747d2c6b6c26c064652afcb964c15f1b1e596ec052b2aa19b83948ae27
  => [internal] load build context
  => => transferring context: 76.69kB
  => [2/3] RUN rm -rf /usr/share/nginx/html/*
  => [3/3] COPY . /usr/share/nginx/html
  => exporting to image
  => => exporting layers
  => => writing image sha256:42ce0c3d65ee3a2b27491a49247899c875655b60049ce16af99f182f7eaa7342
  => => naming to docker.io/apexplayground/frontend:latest

 What's Next?
   View a summary of image vulnerabilities and recommendations → docker scout quickview
(base) PS C:\Users\ogbed\OneDrive\Desktop\ET_WebIDE\Frontend>
```

```
What's Next?
  View a summary of image vulnerabilities and recommendations → docker scout quickview
(base) PS C:\Users\ogbed\OneDrive\Desktop\ET_WebIDE\Frontend> docker push  apexplayground/my-frontend-app:latest
The push refers to repository [docker.io/apexplayground/my-frontend-app]
3e7641874d58: Pushed
75fa640b030d: Pushed
ce495f7b0b7d: Pushed
9c70f446fbe2: Mounted from library/nginx
5be225e16e44: Mounted from library/nginx
3d04ead9b400: Mounted from library/nginx
af5598fef05f: Mounted from library/nginx
8fbd5a835e5e: Mounted from library/nginx
75061be64847: Pushed
d4fc045c9e3a: Mounted from library/redis
latest: digest: sha256:9f7fb692ff7c6c874320b326c0bb8f30165df06eac4904d0c22e7766804486c9 size: 2404
(base) PS C:\Users\ogbed\OneDrive\Desktop\ET_WebIDE\Frontend>
```

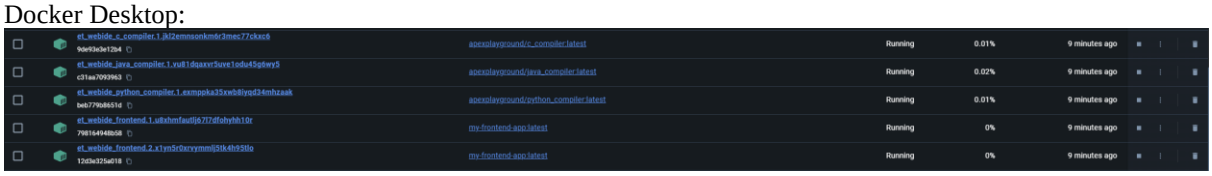
Deploying compose file

```
(base) PS C:\Users\ogbed\OneDrive\Desktop\ET_WebIDE> docker stack deploy -c docker-compose.yml et_webide
Since --detach=false was not specified, tasks will be created in the background.
In a future release, --detach=false will become the default.
Creating network et_webide_webnet
Creating service et_webide_c_compiler
Creating service et_webide_java_compiler
Creating service et_webide_python_compiler
Creating service et_webide_frontend
(base) PS C:\Users\ogbed\OneDrive\Desktop\ET_WebIDE>
```

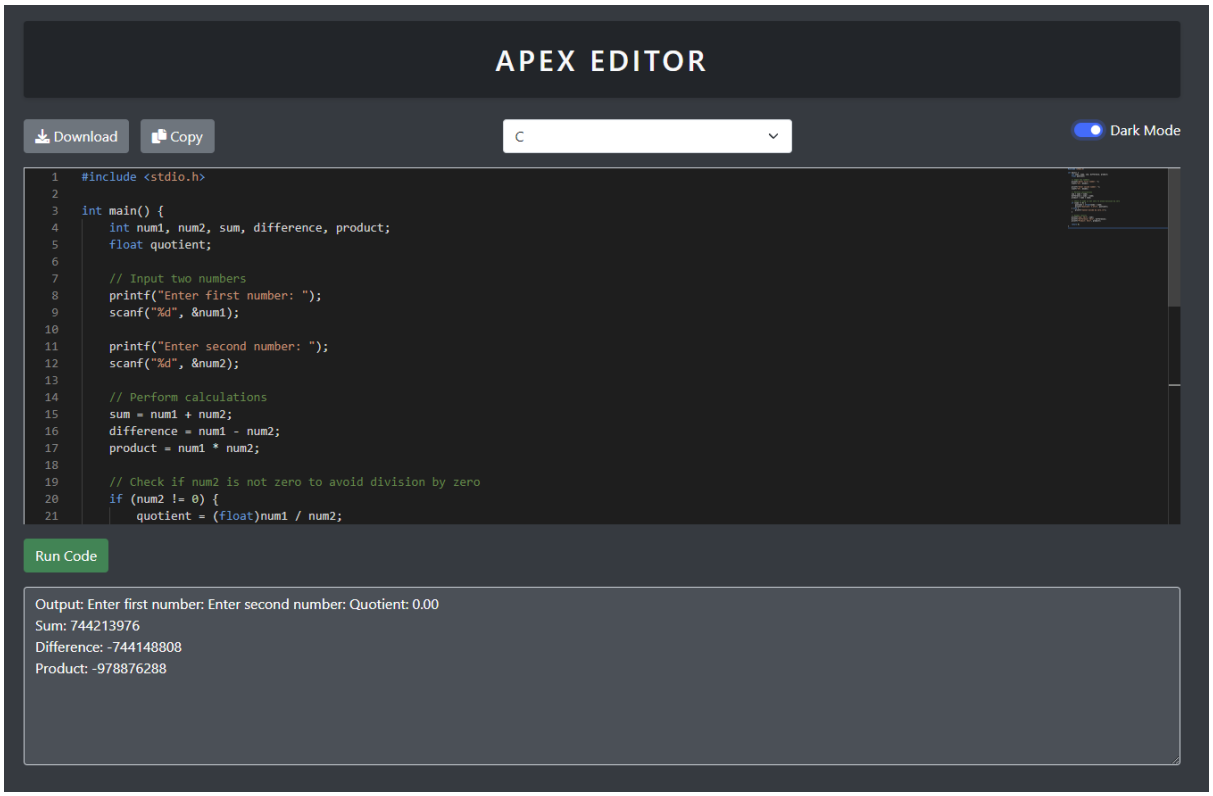
Monitoring deployment:

```
(base) PS C:\Users\ogbed\OneDrive\Desktop\ET_WebIDE> docker service ls
ID             NAME                      MODE         REPLICAS   IMAGE                                  PORTS
20flyuesrbf9   et_webide_c_compiler       replicated   1/1        apexplayground/c_compiler:latest       *:5002->5002/tcp
kjihxj3d1cmn   et_webide_frontend         replicated   2/2        my-frontend-app:latest                 *:80->80/tcp
muj7aa2ya06y   et_webide_java_compiler    replicated   1/1        apexplayground/java_compiler:latest    *:5001->5001/tcp
4elldgedtet0   et_webide_python_compiler  replicated   1/1        apexplayground/python_compiler:latest  *:5000->5000/tcp
(base) PS C:\Users\ogbed\OneDrive\Desktop\ET_WebIDE>
```

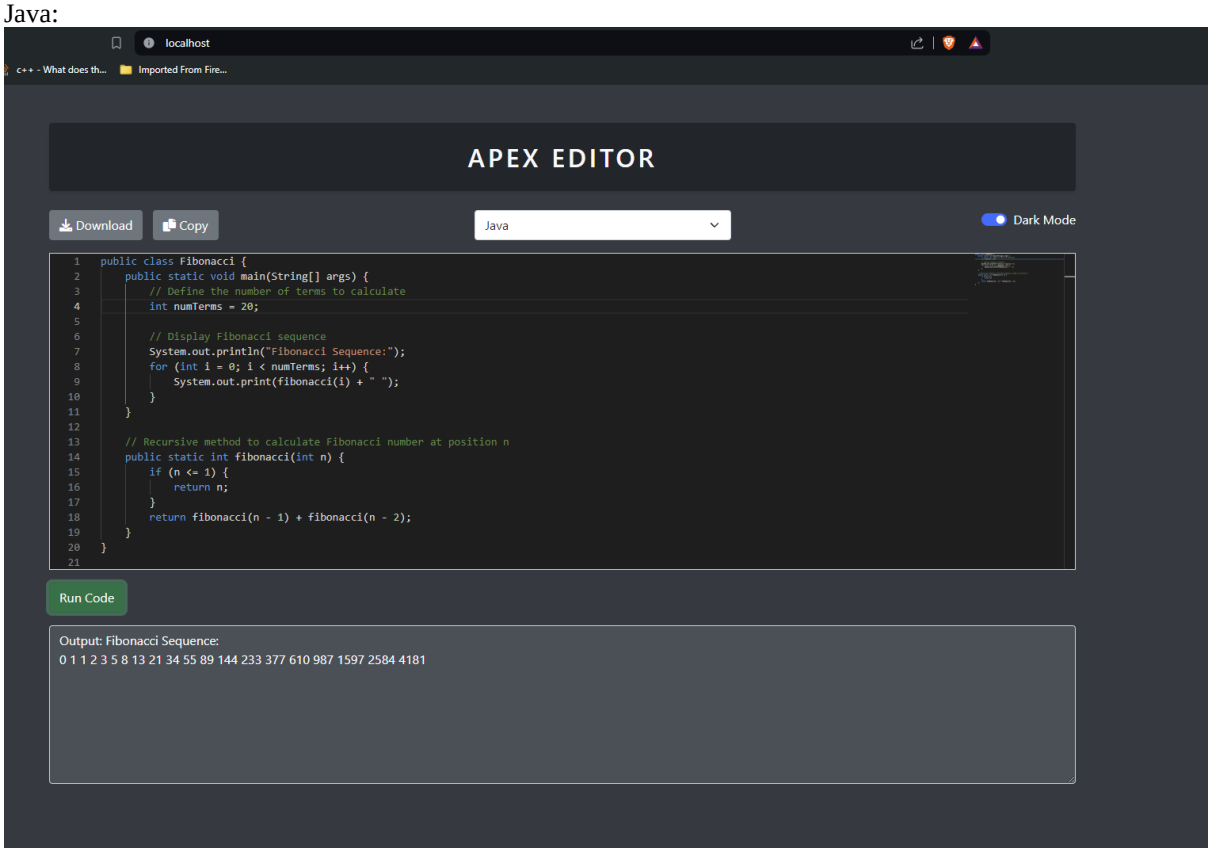
Docker Desktop:



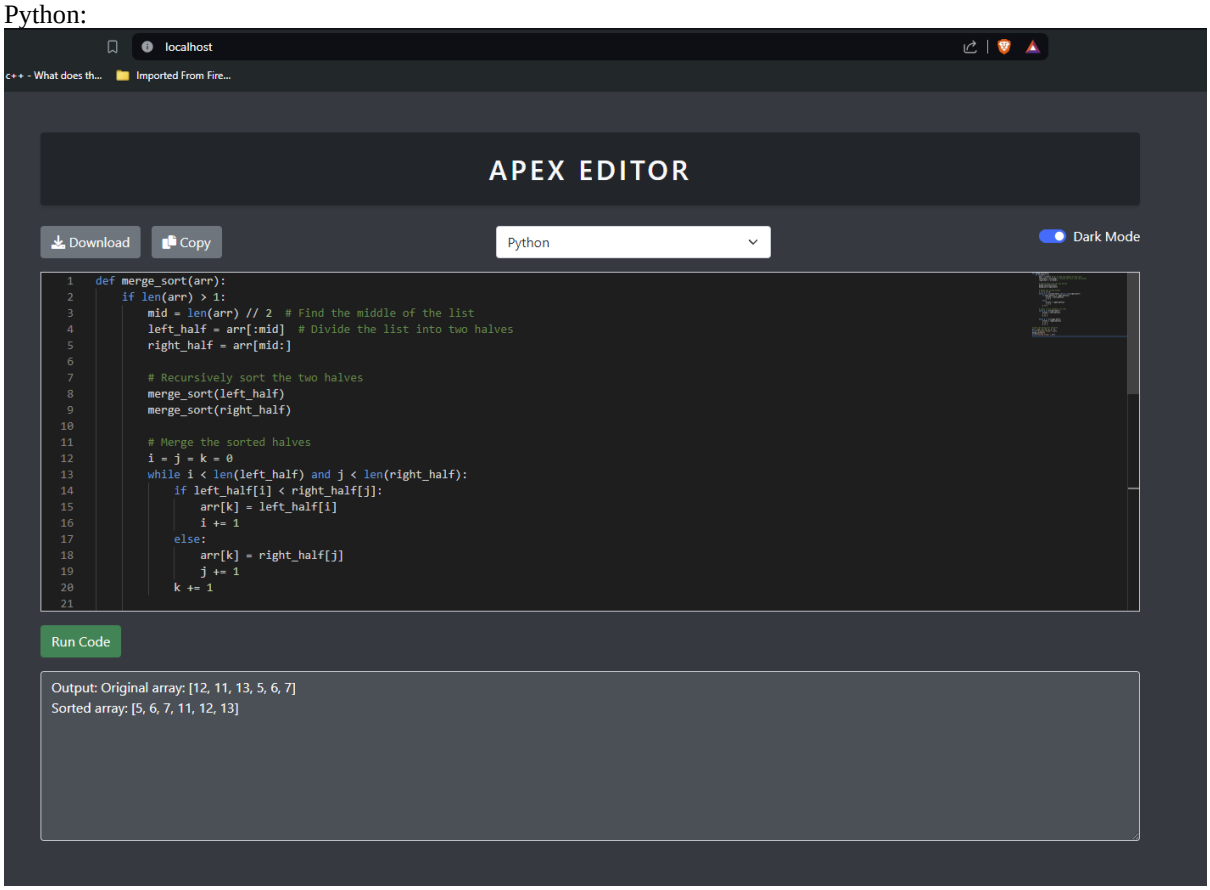
Web Test
C:


APEX EDITOR
Download
Copy
C
Dark Mode
#include <stdio.h>
int main() {
int num1, num2, sum, difference, product;
float quotient;
// Input two numbers
printf("Enter first number: ");
scanf("%d", &num1);
printf("Enter second number: ");
scanf("%d", &num2);
// Perform calculations
sum = num1 + num2;
difference = num1 - num2;
product = num1 * num2;
// Check if num2 is not zero to avoid division by zero
if (num2 != 0) {
quotient = (float)num1 / num2;
Run Code
Output: Enter first number: Enter second number: Quotient: 0.00
Sum: 744213976
Difference: -744148808
Product: -978876288

Java:


localhost
c++ - What does th...
Imported From Fire...
APEX EDITOR
Download
Copy
Java
Dark Mode
public class Fibonacci {
public static void main(String[] args) {
// Define the number of terms to calculate
int numTerms = 20;
// Display Fibonacci sequence
System.out.println("Fibonacci Sequence:");
for (int i = 0; i < numTerms; i++) {
System.out.print(fibonacci(i) + " ");
}
}
// Recursive method to calculate Fibonacci number at position n
public static int fibonacci(int n) {
if (n <= 1) {
return n;
}
return fibonacci(n - 1) + fibonacci(n - 2);
}
}
Run Code
Output: Fibonacci Sequence:
0 1 1 2 3 5 8 13 21 34 55 89 144 233 377 610 987 1597 2584 4181

Python:


localhost
c++ - What does th...
Imported From Fire...
APEX EDITOR
Download
Copy
Python
Dark Mode
def merge_sort(arr):
if len(arr) > 1:
mid = len(arr) // 2 # Find the middle of the list
left_half = arr[:mid] # Divide the list into two halves
right_half = arr[mid:]
# Recursively sort the two halves
merge_sort(left_half)
merge_sort(right_half)
# Merge the sorted halves
i = j = k = 0
while i < len(left_half) and j < len(right_half):
if left_half[i] < right_half[j]:
arr[k] = left_half[i]
i += 1
else:
arr[k] = right_half[j]
j += 1
k += 1
Run Code
Output: Original array: [12, 11, 13, 5, 6, 7]
Sorted array: [5, 6, 7, 11, 12, 13]