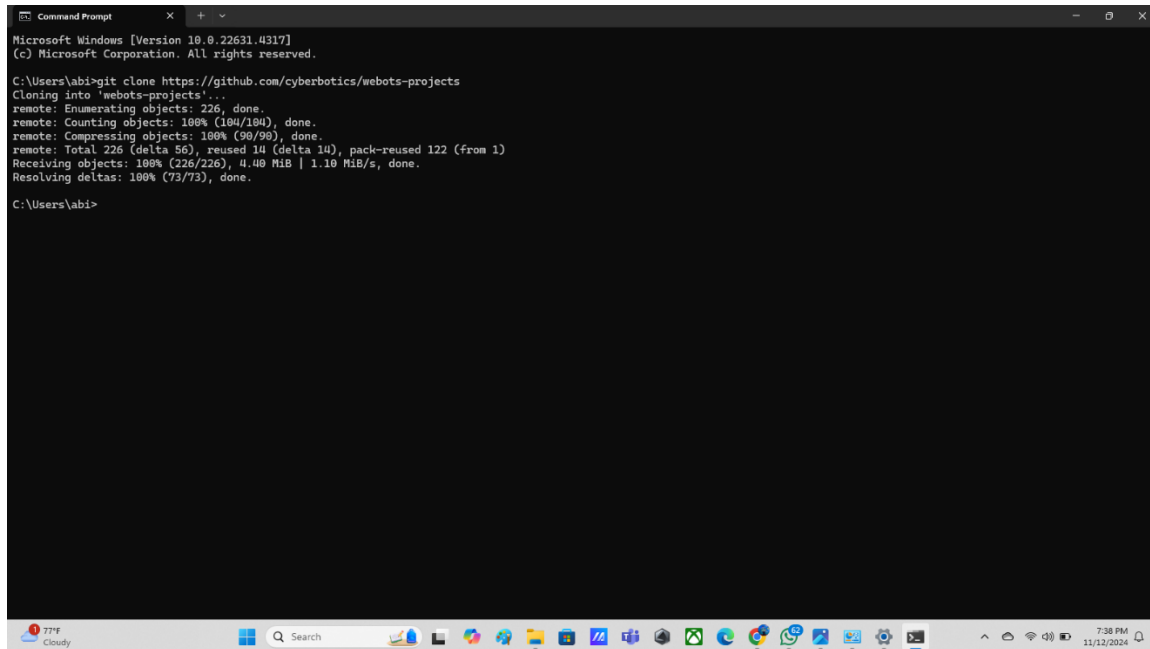


Nama : Ketut Satria Wibisana  
NIM : 1103213148  
Kelas : TK-45-G09

## Langkah-Langkah JetBot Basic Motion, Collect Data, dan Collision Avoidance

1. Jalankan syntax **git clone** <https://github.com/cyberbotics/webots-projects> untuk clone webots-projects

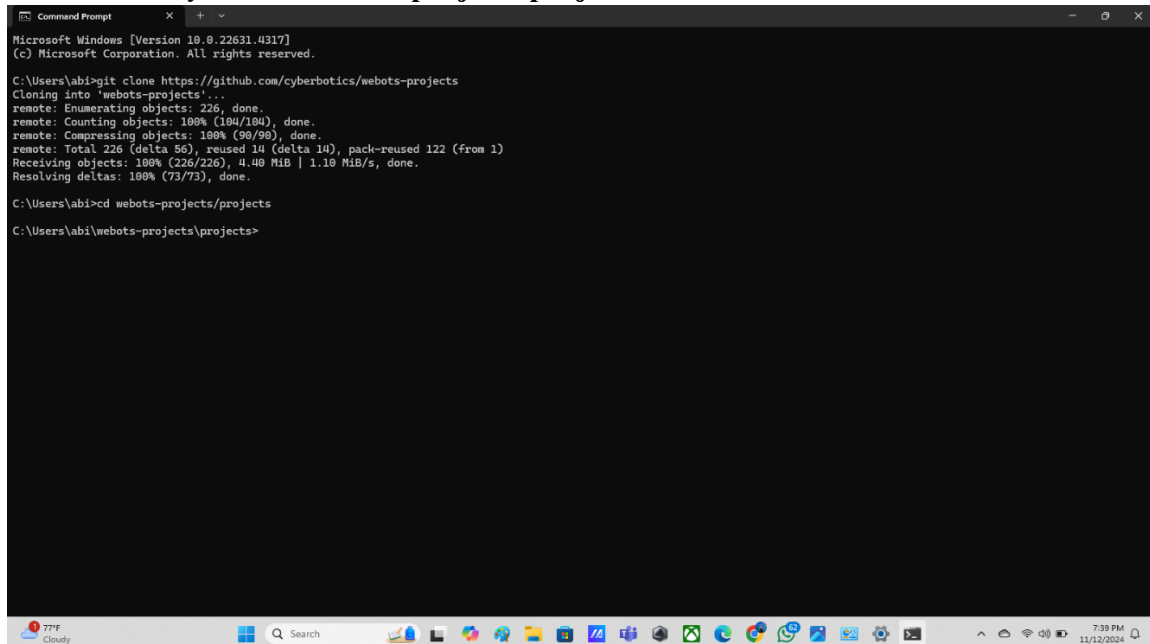


```
Microsoft Windows [Version 10.0.22631.4317]
(c) Microsoft Corporation. All rights reserved.

C:\Users\labi>git clone https://github.com/cyberbotics/webots-projects
Cloning into 'webots-projects'...
remote: Enumerating objects: 226, done.
remote: Counting objects: 100% (104/104), done.
remote: Compressing objects: 100% (90/90), done.
remote: Total 226 (delta 56), reused 14 (delta 14), pack-reused 122 (from 1)
Receiving objects: 100% (226/226), 4.48 MiB | 1.10 MiB/s, done.
Resolving deltas: 100% (73/73), done.

C:\Users\labi>
```

2. Jalankan syntax **cd webots-projects/projects** untuk masuk ke direktori.



```
Microsoft Windows [Version 10.0.22631.4317]
(c) Microsoft Corporation. All rights reserved.

C:\Users\labi>git clone https://github.com/cyberbotics/webots-projects
Cloning into 'webots-projects'...
remote: Enumerating objects: 226, done.
remote: Counting objects: 100% (104/104), done.
remote: Compressing objects: 100% (90/90), done.
remote: Total 226 (delta 56), reused 14 (delta 14), pack-reused 122 (from 1)
Receiving objects: 100% (226/226), 4.48 MiB | 1.10 MiB/s, done.
Resolving deltas: 100% (73/73), done.

C:\Users\labi>cd webots-projects/projects
C:\Users\labi\webots-projects\projects>
```

### 3. Jalankan syntax **pip install torch** untuk menginstall torch yang dibutuhkan untuk webots.

```
Command Prompt
Resolving deltas: 100% (73/73), done.

C:\Users\abi>cd webots-projects/projects

C:\Users\abi\webots-projects\projects>pip install torch
Collecting torch
  Downloading torch-2.5.1-cp312-cp312-win_amd64.whl.metadata (28 kB)
Collecting filelock (from torch)
  Downloading filelock-3.16.1-py3-none-any.whl.metadata (2.9 kB)
Collecting typing-extensions>=4.8.0 (from torch)
  Downloading typing_extensions-4.12.2-py3-none-any.whl.metadata (3.0 kB)
Collecting networkx (from torch)
  Downloading networkx-3.4.2-py3-none-any.whl.metadata (6.3 kB)
Collecting jinja2 (from torch)
  Downloading jinja2-3.1.4-py3-none-any.whl.metadata (2.6 kB)
Collecting fsspec (from torch)
  Downloading fsspec-2024.10.0-py3-none-any.whl.metadata (11 kB)
Collecting setuptools (from torch)
  Downloading setuptools-75.4.0-py3-none-any.whl.metadata (6.8 kB)
Collecting sympy==1.13.1 (from torch)
  Downloading sympy-1.13.1-py3-none-any.whl.metadata (12 kB)
Collecting mpmath<1.4,>=1.1.0 (from sympy==1.13.1->torch)
  Downloading mpmath-1.3.0-py3-none-any.whl.metadata (8.6 kB)
Collecting MarkupSafe>=2.0 (from jinja2->torch)
  Downloading MarkupSafe-3.0.2-cp312-cp312-win_amd64.whl.metadata (4.1 kB)
Downloading torch-2.5.1-cp312-cp312-win_amd64.whl (203.0 MB)
203.0/203.0 MB 335.9 kB/s eta 0:00:00
Downloading sympy-1.13.1-py3-none-any.whl (6.2 MB)
6.2/6.2 MB 231.4 kB/s eta 0:00:00
Downloading typing_extensions-4.12.2-py3-none-any.whl (37 kB)
Downloading filelock-3.16.1-py3-none-any.whl (16 kB)
Downloading fsspec-2024.10.0-py3-none-any.whl (179 kB)
Downloading jinja2-3.1.4-py3-none-any.whl (133 kB)
Downloading networkx-3.4.2-py3-none-any.whl (1.7 MB)
1.7/1.7 MB 105.2 kB/s eta 0:00:00
Downloading setuptools-75.4.0-py3-none-any.whl (1.2 MB)
1.2/1.2 MB 109.2 kB/s eta 0:00:00
Downloading MarkupSafe-3.0.2-cp312-cp312-win_amd64.whl (15 kB)
Downloading mpmath-1.3.0-py3-none-any.whl (536 kB)
536.2/536.2 kB 109.6 kB/s eta 0:00:00
Installing collected packages: mpmath, typing-extensions, sympy, setuptools, networkx, MarkupSafe, fsspec, filelock, jinja2, torch
Successfully installed MarkupSafe-3.0.2 filelock-3.16.1 fsspec-2024.10.0 jinja2-3.1.4 mpmath-1.3.0 networkx-3.4.2 setuptools-75.4.0 sympy-1.13.1 torch-2.5.1 typing-extensions-4.12.2

[notice] A new release of pip is available: 24.2 -> 24.3.1
[notice] To update, run: python.exe -m pip install --upgrade pip

C:\Users\abi\webots-projects\projects>pip install torchvision
Collecting torchvision
  Downloading torchvision-0.20.1-cp312-cp312-win_amd64.whl.metadata (6.2 kB)
Collecting numpy (from torchvision)
  Downloading numpy-2.1.3-cp312-cp312-win_amd64.whl.metadata (60 kB)
Requirement already satisfied: torch==2.5.1 in c:\users\abi\appdata\local\programs\python\python312\lib\site-packages (from torchvision) (2.5.1)
Collecting pillow!=8.3.*,>=5.3.0 (from torchvision)
  Downloading pillow-11.0.0-cp312-cp312-win_amd64.whl.metadata (9.3 kB)
Requirement already satisfied: filelock in c:\users\abi\appdata\local\programs\python\python312\lib\site-packages (from torch==2.5.1->torchvision) (3.16.1)
Requirement already satisfied: typing-extensions>=4.8.0 in c:\users\abi\appdata\local\programs\python\python312\lib\site-packages (from torch==2.5.1->torchvision) (4.12.2)
Requirement already satisfied: networkx in c:\users\abi\appdata\local\programs\python\python312\lib\site-packages (from torch==2.5.1->torchvision) (3.4.2)
Requirement already satisfied: jinja2 in c:\users\abi\appdata\local\programs\python\python312\lib\site-packages (from torch==2.5.1->torchvision) (3.1.4)
Requirement already satisfied: fsspec in c:\users\abi\appdata\local\programs\python\python312\lib\site-packages (from torch==2.5.1->torchvision) (2024.10.0)
Requirement already satisfied: sympy==1.13.1 in c:\users\abi\appdata\local\programs\python\python312\lib\site-packages (from torch==2.5.1->torchvision) (1.13.1)
Requirement already satisfied: mpmath<1.4,>=1.1.0 in c:\users\abi\appdata\local\programs\python\python312\lib\site-packages (from sympy==1.13.1->torch==2.5.1->torchvision) (1.3.0)
Requirement already satisfied: MarkupSafe>=2.0 in c:\users\abi\appdata\local\programs\python\python312\lib\site-packages (from jinja2->torch==2.5.1->torchvision) (3.0.2)
Downloading torchvision-0.20.1-cp312-cp312-win_amd64.whl (1.6 MB)
1.6/1.6 MB 1.5 MB/s eta 0:00:00
Downloading pillow-11.0.0-cp312-cp312-win_amd64.whl (2.6 MB)
2.6/2.6 MB 2.5 MB/s eta 0:00:00
Downloading numpy-2.1.3-cp312-cp312-win_amd64.whl (12.6 MB)
12.6/12.6 MB 2.5 MB/s eta 0:00:00
Installing collected packages: pillow, numpy, torchvision
Successfully installed numpy-2.1.3 pillow-11.0.0 torchvision-0.20.1

[notice] A new release of pip is available: 24.2 -> 24.3.1
[notice] To update, run: python.exe -m pip install --upgrade pip

C:\Users\abi\webots-projects\projects>
```

### 4. Jalankan syntax **pip install torchvision** untuk menginstall torchvision yang dibutuhkan oleh webots.

```
Command Prompt
1.2/1.2 MB 109.2 kB/s eta 0:00:00
Downloading MarkupSafe-3.0.2-cp312-cp312-win_amd64.whl (15 kB)
536.2/536.2 kB 109.6 kB/s eta 0:00:00
Installing collected packages: mpmath, typing-extensions, sympy, setuptools, networkx, MarkupSafe, fsspec, filelock, jinja2, torch
Successfully installed MarkupSafe-3.0.2 filelock-3.16.1 fsspec-2024.10.0 jinja2-3.1.4 mpmath-1.3.0 networkx-3.4.2 setuptools-75.4.0 sympy-1.13.1 torch-2.5.1 typing-extensions-4.12.2

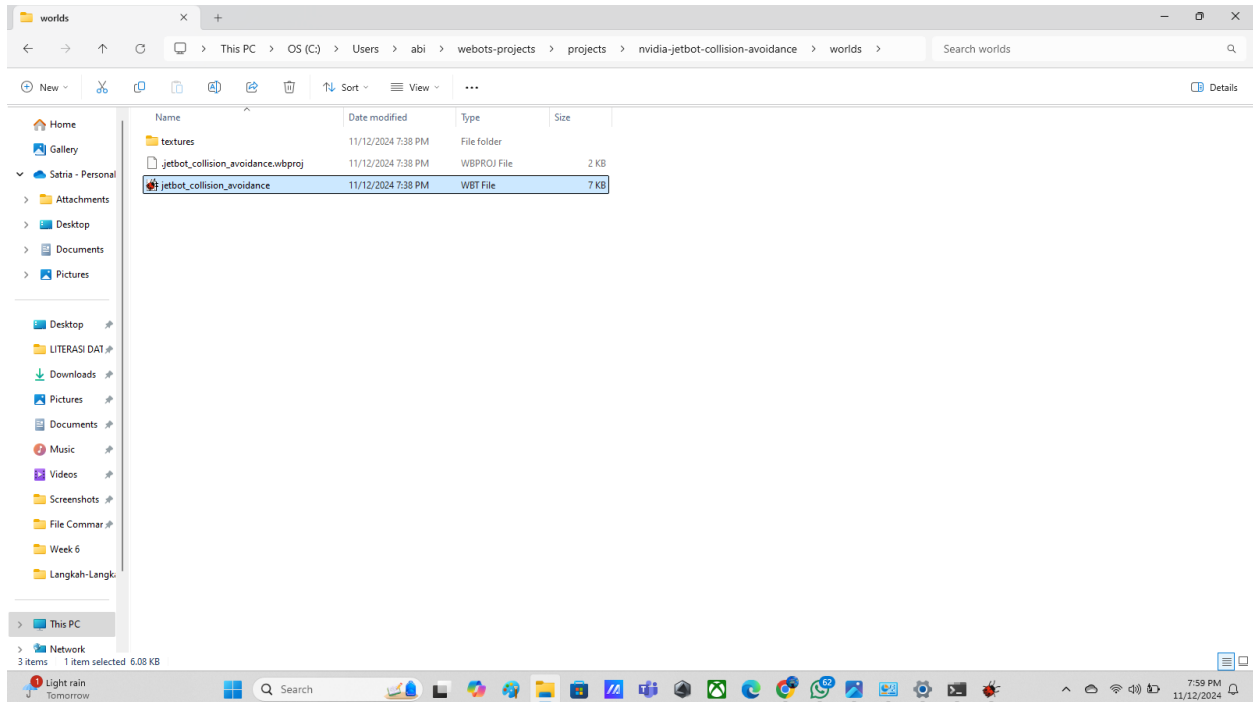
[notice] A new release of pip is available: 24.2 -> 24.3.1
[notice] To update, run: python.exe -m pip install --upgrade pip

C:\Users\abi\webots-projects\projects>pip install torchvision
Collecting torchvision
  Downloading torchvision-0.20.1-cp312-cp312-win_amd64.whl.metadata (6.2 kB)
Collecting numpy (from torchvision)
  Downloading numpy-2.1.3-cp312-cp312-win_amd64.whl.metadata (60 kB)
Requirement already satisfied: torch==2.5.1 in c:\users\abi\appdata\local\programs\python\python312\lib\site-packages (from torchvision) (2.5.1)
Collecting pillow!=8.3.*,>=5.3.0 (from torchvision)
  Downloading pillow-11.0.0-cp312-cp312-win_amd64.whl.metadata (9.3 kB)
Requirement already satisfied: filelock in c:\users\abi\appdata\local\programs\python\python312\lib\site-packages (from torch==2.5.1->torchvision) (3.16.1)
Requirement already satisfied: typing-extensions>=4.8.0 in c:\users\abi\appdata\local\programs\python\python312\lib\site-packages (from torch==2.5.1->torchvision) (4.12.2)
Requirement already satisfied: networkx in c:\users\abi\appdata\local\programs\python\python312\lib\site-packages (from torch==2.5.1->torchvision) (3.4.2)
Requirement already satisfied: jinja2 in c:\users\abi\appdata\local\programs\python\python312\lib\site-packages (from torch==2.5.1->torchvision) (3.1.4)
Requirement already satisfied: fsspec in c:\users\abi\appdata\local\programs\python\python312\lib\site-packages (from torch==2.5.1->torchvision) (2024.10.0)
Requirement already satisfied: sympy==1.13.1 in c:\users\abi\appdata\local\programs\python\python312\lib\site-packages (from torch==2.5.1->torchvision) (1.13.1)
Requirement already satisfied: mpmath<1.4,>=1.1.0 in c:\users\abi\appdata\local\programs\python\python312\lib\site-packages (from sympy==1.13.1->torch==2.5.1->torchvision) (1.3.0)
Requirement already satisfied: MarkupSafe>=2.0 in c:\users\abi\appdata\local\programs\python\python312\lib\site-packages (from jinja2->torch==2.5.1->torchvision) (3.0.2)
Downloading torchvision-0.20.1-cp312-cp312-win_amd64.whl (1.6 MB)
1.6/1.6 MB 1.5 MB/s eta 0:00:00
Downloading pillow-11.0.0-cp312-cp312-win_amd64.whl (2.6 MB)
2.6/2.6 MB 2.5 MB/s eta 0:00:00
Downloading numpy-2.1.3-cp312-cp312-win_amd64.whl (12.6 MB)
12.6/12.6 MB 2.5 MB/s eta 0:00:00
Installing collected packages: pillow, numpy, torchvision
Successfully installed numpy-2.1.3 pillow-11.0.0 torchvision-0.20.1

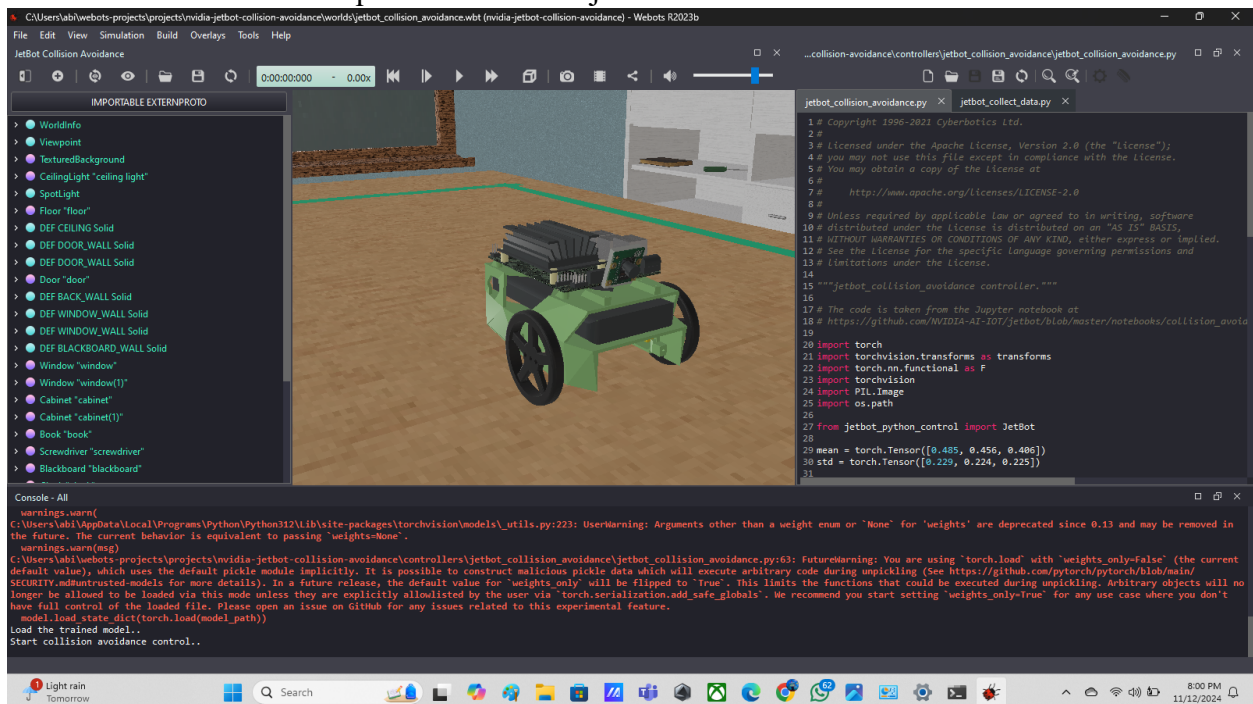
[notice] A new release of pip is available: 24.2 -> 24.3.1
[notice] To update, run: python.exe -m pip install --upgrade pip

C:\Users\abi\webots-projects\projects>
```

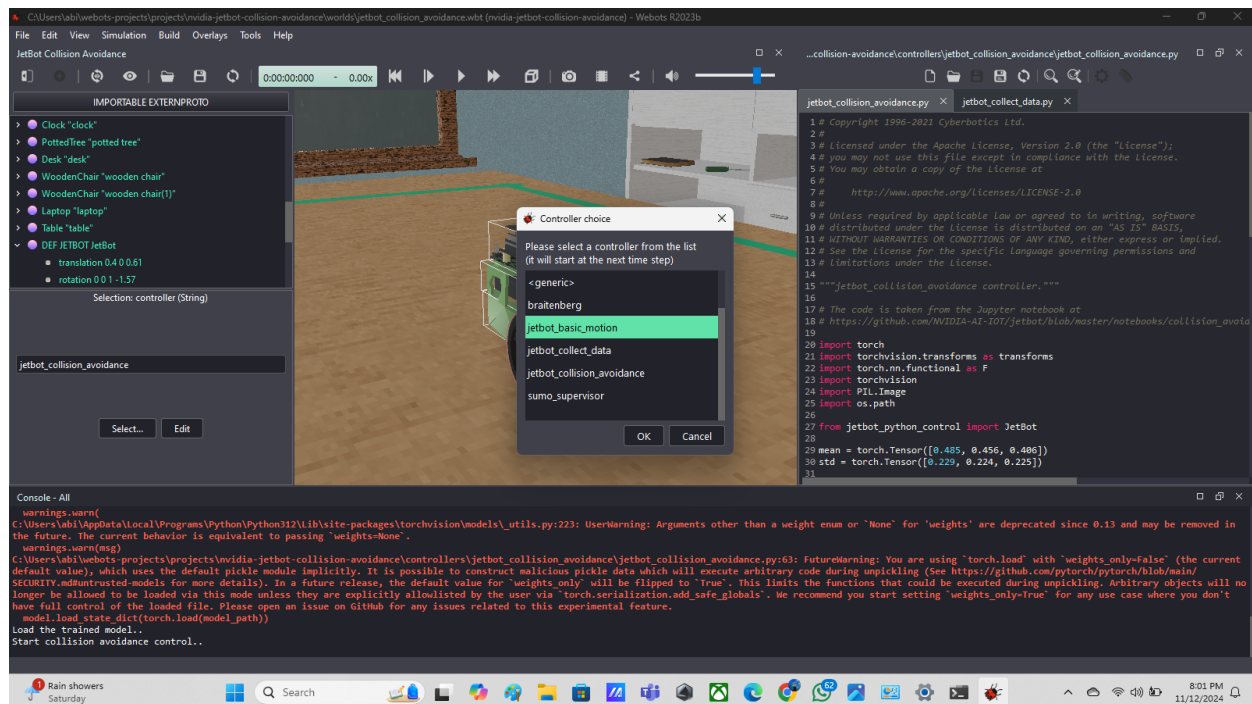
5. Buka file world webots yang berada di Lokasi **C:/users/username/webots-projects/projects/nvidia-jetbotcollision-avoidance/worlds/jetbot\_collision\_avoidance.wbt**.



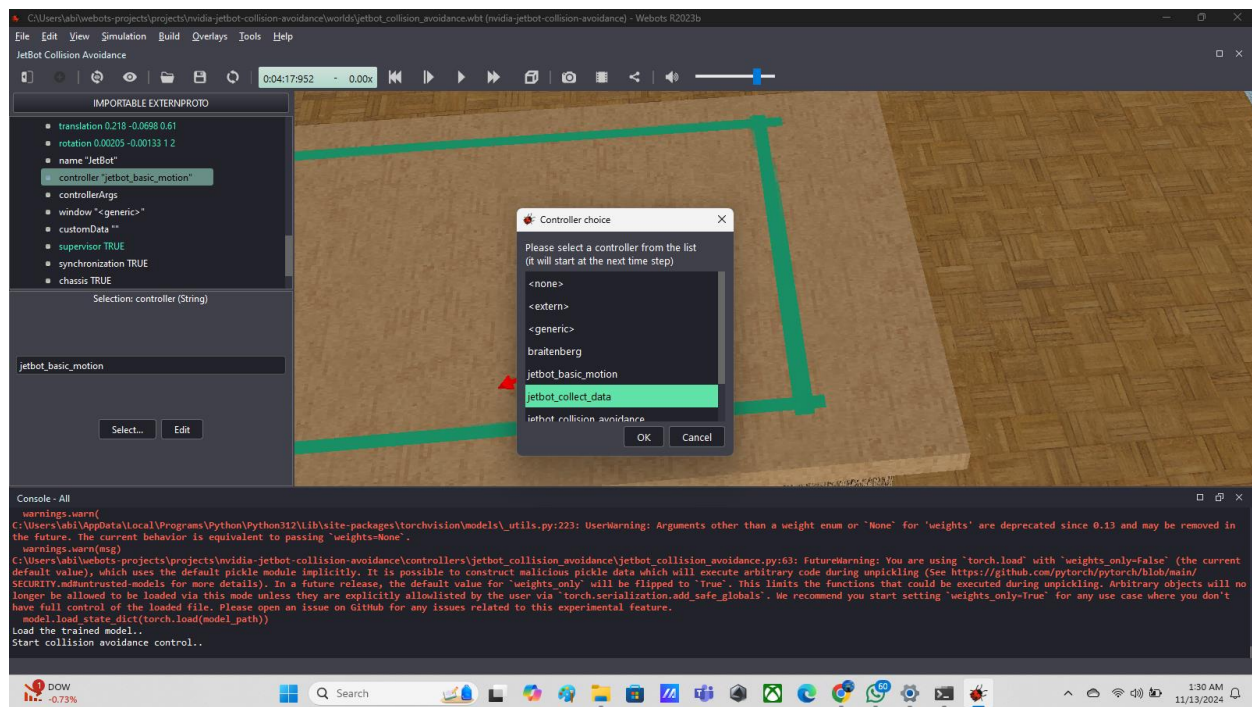
6. Maka akan terbuka tampilan robot nvidia jetbot collision avoidance.



7. Agar dapat menjalankan simulasi jetbot basic motion, ubah controller ke jetbot\_basic\_motion. Untuk video simulasi terdapat di folder Video simulasi.



8. Agar dapat untuk menjalankan simulasi jetbot collect data, ubah controller ke jetbot\_collect\_data. Untuk video simulasi terdapat di folder Video simulasi.



9. Agar dapat menjalankan simulasi jetbot collision avoidance, ubah controller ke jetbot\_collision\_avoidance. Untuk video simulasi terdapat di folder Video simulasi.

