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**Environment untuk Multimedia**

Tugas Ke: **Worksheet 1: Setup Python**

Mata Kuliah: **Sistem Teknologi Multimedia (IF25-40305)**

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## 1 Tujuan Pembelajaran

Setelah menyelesaikan worksheet ini, mahasiswa diharapkan mampu:

- Memahami pentingnya manajemen environment Python untuk pengembangan multimedia
- Menginstall dan mengkonfigurasi Python environment menggunakan conda, venv, atau uv
- Menginstall library-library Python yang diperlukan untuk multimedia processing
- Memverifikasi instalasi dengan mengimpor dan menguji library multimedia
- Mendokumentasikan proses konfigurasi dan hasil pengujian dalam format L<sup>A</sup>T<sub>E</sub>X

## 2 Latar Belakang

Python telah menjadi bahasa pemrograman yang sangat populer untuk multimedia processing karena memiliki ekosistem library yang sangat kaya. Namun, untuk dapat bekerja dengan multimedia secara efektif, kita perlu mengatur environment Python dengan benar dan menginstall library-library yang tepat.

Manajemen environment Python sangat penting untuk:

- Menghindari konflik antar library (dependency conflict)
- Memastikan reproducibility dari project
- Memudahkan kolaborasi antar developer
- Memisahkan project yang berbeda dengan requirement yang berbeda

## 3 Instruksi Tugas

### 3.1 Persiapan

Sebelum memulai, pastikan Anda telah:

- Menginstall Python 3.8 atau lebih baru di sistem Anda
- Memilih salah satu tool manajemen environment: **conda**, **venv**, atau **uv**
- Membuka terminal/command prompt
- Menyiapkan dokumen L<sup>A</sup>T<sub>E</sub>X ini untuk dokumentasi

## 3.2 Bagian 1: Membuat Environment Python

Pilih **SALAH SATU** dari tiga opsi berikut dan ikuti langkah-langkahnya:

### 3.2.1 Opsi 1: Menggunakan Conda (Direkomendasikan untuk pemula)

Jalankan perintah berikut di terminal:

```
1 # Membuat environment baru dengan nama 'multimedia'
2 conda create -n multimedia python=3.11
3
4 # Mengaktifkan environment
5 conda activate multimedia
6
7 # Verifikasi environment aktif
8 conda info --envs
```

Kode 1: Membuat environment dengan Conda

### 3.2.2 Opsi 2: Menggunakan venv (Built-in Python)

```
1 # Membuat environment baru
2 python3 -m venv multimedia-env
3
4 # Mengaktifkan environment (Linux/Mac)
5 source multimedia-env/bin/activate
6
7 # Mengaktifkan environment (Windows)
8 # multimedia-env\Scripts\activate
9
10 # Verifikasi environment aktif
11 which python
```

Kode 2: Membuat environment dengan venv

### 3.2.3 Opsi 3: Menggunakan uv (Modern dan cepat)

```
1 # Install uv terlebih dahulu jika belum ada
2 # pip install uv
3
4 # Membuat environment baru
5 uv venv multimedia-uv
6
7 # Mengaktifkan environment (Linux/Mac)
8 source multimedia-uv/bin/activate
9
10 # Mengaktifkan environment (Windows)
11 # multimedia-uv\Scripts\activate
12
13 # Verifikasi environment aktif
14 which python
```

Kode 3: Membuat environment dengan uv

**Dokumentasikan di sini:**

- Tool manajemen environment yang Anda pilih: **[uv]**
- Screenshot atau copy-paste output dari perintah verifikasi environment

```

PS D:\00 kuliah s7\multimedia\tugas 1> uv venv multimedia-uv
Using Python 3.12.10 interpreter at: C:\Users\ACER\AppData\Local\Microsoft\WindowsApps\PythonSoftwareFoundation.Python.3.12_gh252kfra8p0\python.exe
Creating virtual environment at: multimedia-uv
Activate with: multimedia-uv\Scripts\activate
PS D:\00 kuliah s7\multimedia\tugas 1> multimedia-uv\Scripts\activate
(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1> which python
which : The term 'which' is not recognized as the name of a cmdlet, function, script file, or operable program. Check the spelling of the name, or if a path was included,
verify that the path is correct and try again.
At line:1 char:1
+ ~~~~~
+ ~~~~~
+ CategoryInfo          : ObjectNotFound: (which:String) [], CommandNotFoundException
+ FullyQualifiedErrorId : CommandNotFoundException

(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1> where python
(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1> Get-Command python

CommandType Name Version Source
-----
Application python.exe 3.12.10... D:\00 kuliah s7\multimedia\tugas 1\multimedia-uv\Scripts\python.exe

```

Gambar 1: Hasil verifikasi environment dengan uv (which python tidak bisa digunakan di windows)

### 3.3 Bagian 2: Instalasi Library Multimedia

Setelah environment aktif, install library-library berikut:

#### 3.3.1 Library Audio Processing

```

1 # Untuk conda:
2 conda install -c conda-forge librosa soundfile scipy
3
4 # Untuk pip (venv/uv):
5 pip install librosa soundfile scipy

```

Kode 4: Instalasi library audio

#### 3.3.2 Library Image Processing

```

1 # Untuk conda:
2 conda install -c conda-forge opencv pillow scikit-image matplotlib
3
4 # Untuk pip (venv/uv):
5 pip install opencv-python pillow scikit-image matplotlib

```

Kode 5: Instalasi library image

#### 3.3.3 Library Video Processing

```

1 # Untuk conda:
2 conda install -c conda-forge ffmpeg
3 pip install moviepy
4
5 # Untuk pip (venv/uv):
6 pip install moviepy

```

Kode 6: Instalasi library video

#### 3.3.4 Library General Purpose

```

1 # Untuk conda:
2 conda install numpy pandas jupyter
3
4 # Untuk pip (venv/uv):
5 pip install numpy pandas jupyter

```

Kode 7: Instalasi library umum

### Dokumentasikan di sini:

- Perintah instalasi yang Anda gunakan
  1. Untuk mendownload pip dalam environment multimedia-uv `.\multimedia-uv\Scripts\python.exe -m ensurepip -upgrade`
  2. `pip install librosa soundfile scipy`
  3. `pip install opencv-python pillow scikit-image matplotlib`
  4. `pip install moviepy`
  5. `pip install numpy pandas jupyter`
- Screenshot proses instalasi atau output sukses

```
(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1> .\multimedia-uv\Scripts\pip --version
>>
pip 25.2 from D:\00 kuliah s7\multimedia\tugas 1\multimedia-uv\Lib\site-packages\pip (python 3.12)
(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1> █
```

Gambar 2: command untuk verifikasi pip dalam env multimedia-uv

```
(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1> pip install librosa soundfile scipy
Defaulting to user installation because normal site-packages is not writeable
Collecting librosa
  Using cached librosa-0.11.0-py3-none-any.whl.metadata (8.7 kB)
Collecting soundfile
  Using cached soundfile-0.13.1-py2-py3-none-win_amd64.whl.metadata (16 kB)
Collecting scipy
  Using cached scipy-1.16.1-cp312-cp312-win_amd64.whl.metadata (60 kB)
Collecting audioread<2.1.9
  Using cached audioread-3.0.1-py3-none-any.whl.metadata (8.4 kB)
Collecting numba<0.51.0
  Using cached numba-0.61.2-cp312-cp312-win_amd64.whl.metadata (2.9 kB)
Requirement already satisfied: numpy>=1.22.3 in c:\users\acer\appdata\local\packages\pythonsoftwarefoundation.python.3.12_qbz5n2kfra8p0\localcache\local-packages\python312\site-packages (from librosa) (2.3.1)
Collecting scikit-learn<=1.1.0
  Using cached scikit_learn-1.7.1-cp312-cp312-win_amd64.whl.metadata (11 kB)
Collecting joblib<=1.5.1-py3-none-any.whl.metadata (5.6 kB)
Collecting decorator<4.3.0
  Using cached decorator-5.2.1-py3-none-any.whl.metadata (3.9 kB)
```

Gambar 3: Proses instalasi librosa soundfile scipy

```
(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1> pip install opencv-python pillow scikit-image matplotlib
Defaulting to user installation because normal site-packages is not writeable
Collecting opencv-python
  Downloading opencv_python-4.12.0.88-cp37-abi3-win_amd64.whl.metadata (19 kB)
Requirement already satisfied: pillow in c:\users\acer\appdata\local\packages\pythonsoftwarefoundation.python.3.12_qbz5n2kfra8p0\localcache\local-packages\python312\site-packages (11.3.0)
Collecting scikit-image
  Downloading scikit_image-0.25.2-cp312-cp312-win_amd64.whl.metadata (14 kB)
Requirement already satisfied: matplotlib in c:\users\acer\appdata\local\packages\pythonsoftwarefoundation.python.3.12_qbz5n2kfra8p0\localcache\local-packages\python312\site-packages (3.10.3)
Requirement already satisfied: numpy<3.0, >=2 in c:\users\acer\appdata\local\packages\pythonsoftwarefoundation.python.3.12_qbz5n2kfra8p0\localcache\local-packages\python312\site-packages (from opencv-python) (2.2.6)
Requirement already satisfied: scipy>=1.11.4 in c:\users\acer\appdata\local\packages\pythonsoftwarefoundation.python.3.12_qbz5n2kfra8p0\localcache\local-packages\python312\site-packages (from scikit-image) (1.16.1)
Collecting networkx<3.0
  Downloading networkx-3.0-py3-none-any.whl.metadata (6.3 kB)
Collecting imageio<2.35.0, >=2.33
  Downloading imageio-2.37.0-py3-none-any.whl.metadata (5.2 kB)
Collecting tifffile<2022.8.12
  Downloading tifffile-2025.6.11-py3-none-any.whl.metadata (32 kB)
```

Gambar 4: Proses instalasi opencv-python pillow scikit-image matplotlib

```
(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1> pip install moviepy
Defaulting to user installation because normal site-packages is not writeable
Collecting moviepy
  Downloading moviepy-2.2.1-py3-none-any.whl.metadata (6.9 kB)
Requirement already satisfied: decorator<0.9, >=0.4.2 in c:\users\acer\appdata\local\packages\pythonsoftwarefoundation.python.3.12_qbz5n2kfra8p0\localcache\local-packages\python312\site-packages (from moviepy) (5.2.1)
Requirement already satisfied: imageio<3.0, >=2.3 in c:\users\acer\appdata\local\packages\pythonsoftwarefoundation.python.3.12_qbz5n2kfra8p0\localcache\local-packages\python312\site-packages (from moviepy) (2.37.0)
Collecting imageio-ffmpeg<0.2.0
  Downloading imageio_ffmpeg-0.4.0-py3-none-win_amd64.whl.metadata (1.5 kB)
Requirement already satisfied: numpy>=1.25.0 in c:\users\acer\appdata\local\packages\pythonsoftwarefoundation.python.3.12_qbz5n2kfra8p0\localcache\local-packages\python312\site-packages (from moviepy) (2.2.6)
Collecting proglog<0.1.12-py3-none-any.whl
  Downloading proglog-0.1.12-py3-none-any.whl.metadata (764 bytes)
Collecting python-dateutil<3
  Downloading python_dateutil-2.9.0-py2.py3-none-any.whl.metadata (24 kB)
Requirement already satisfied: pillow<12.0, >=9.2.0 in c:\users\acer\appdata\local\packages\pythonsoftwarefoundation.python.3.12_qbz5n2kfra8p0\localcache\local-packages\python312\site-packages (from moviepy) (11.3.0)
Collecting tqdm (from proglog<0.1.12-py3-none-any.whl)
  Downloading tqdm-4.67.1-py3-none-any.whl.metadata (57 kB)
Collecting colorama (from tqdm>=4.6.0)
  Downloading colorama-0.4.6-py2.py3-none-any.whl.metadata (10 kB)
```

Gambar 5: Proses instalasi moviepy

```
(multimedia-s7) PS D:\00 kuliah s7\multimedia\tugas 1> pip install numpy pandas jupyter
Defaulting to user installation because normal site-packages is not writable
Requirement already satisfied: numpy in c:\users\acer\appdata\local\packages\pythonsoftwarefoundation.python.3.12.qbz50kfrap0\localcache\local-packages\python312\site-packages (2.2.6)
Requirement already satisfied: pandas in c:\users\acer\appdata\local\packages\pythonsoftwarefoundation.python.3.12.qbz50kfrap0\localcache\local-packages\python312\site-packages (2.3.0)
Collecting jupyter
  Downloading jupyter-1.1.1-py2.py3-none-any.whl.metadata (2.0 kB)
Requirement already satisfied: python-dateutil<2.8.2 in c:\users\acer\appdata\local\packages\pythonsoftwarefoundation.python.3.12.qbz50kfrap0\localcache\local-packages\python312\site-packages (from pandas) (2.9.0.post0)
Requirement already satisfied: pytz>=2020.1 in c:\users\acer\appdata\local\packages\pythonsoftwarefoundation.python.3.12.qbz50kfrap0\localcache\local-packages\python312\site-packages (from pandas) (2025.2)
Requirement already satisfied: tzdata>=2022.7 in c:\users\acer\appdata\local\packages\pythonsoftwarefoundation.python.3.12.qbz50kfrap0\localcache\local-packages\python312\site-packages (from pandas) (2025.2)
Collecting notebook (from jupyter)
  Downloading notebook-7.4.5-py3-none-any.whl.metadata (10 kB)
Collecting jupyter-console (from jupyter)
  Downloading jupyter_console-8.5.3-py3-none-any.whl.metadata (5.8 kB)
Collecting nbconvert (from jupyter)
  Downloading nbconvert-7.16.6-py3-none-any.whl.metadata (8.5 kB)
```

Gambar 6: Proses instalasi numpy pandas jupyter

- Daftar library yang berhasil diinstall dengan versinya

```
numpy: 2.2.6
pandas: 2.3.2
librosa: 0.11.0
soundfile: 0.13.1
scipy: 1.16.1
opencv-python: 4.12.0
Pillow: 11.3.0
scikit-image: 0.25.2
matplotlib: 3.10.5
moviepy: 2.1.2
jupyter-notebook: 7.4.5
```

### 3.4 Bagian 3: Verifikasi Instalasi

Buat file Python sederhana untuk menguji semua library yang telah diinstall:

**Jalankan script dan dokumentasikan hasilnya:**

```
PS D:\00 kuliah s7\multimedia\tugas 1> python test_multimedia.py
=== checking installed libraries ===
numpy: 2.2.6
pandas: 2.3.0
librosa: 0.11.0
soundfile: 0.13.1
scipy: 1.16.1
opencv-python: 4.12.0
Pillow: 11.3.0
scikit-image: 0.25.2
matplotlib: 3.10.3
moviepy: 2.1.2
jupyter-notebook: 7.4.5
=== Check complete ===
PS D:\00 kuliah s7\multimedia\tugas 1>
```

Gambar 7: Output script untuk verifikasi instalasi (script dilampirkan pada bagian 4)

### 3.5 Bagian 4: Simple Test dengan Sample Code

Buat dan jalankan contoh sederhana untuk setiap kategori multimedia:

#### 3.5.1 Test Audio Processing

```
1 import numpy as np
2 import matplotlib.pyplot as plt
3
4 # Generate simple sine wave
5 duration = 2 # seconds
```

```

6 sample_rate = 44100
7 frequency = 440 # A4 note
8
9 t = np.linspace(0, duration, int(sample_rate * duration))
10 audio_signal = np.sin(2 * np.pi * frequency * t)
11
12 # Plot waveform
13 plt.figure(figsize=(10, 4))
14 plt.plot(t[:1000], audio_signal[:1000]) # Plot first 1000 samples
15 plt.title('Sine Wave (440 Hz)')
16 plt.xlabel('Time (s)')
17 plt.ylabel('Amplitude')
18 plt.grid(True)
19 plt.savefig('sine_wave_test.png', dpi=150, bbox_inches='tight')
20 plt.show()
21
22 print(f"Generated {duration}s sine wave at {frequency}Hz")
23 print(f"Sample rate: {sample_rate}Hz")
24 print(f"Total samples: {len(audio_signal)}")

```

Kode 8: Test audio processing sederhana

### 3.5.2 Test Image Processing

```

1 import numpy as np
2 import matplotlib.pyplot as plt
3 from PIL import Image
4
5 # Create a simple test image
6 width, height = 400, 300
7 image = np.zeros((height, width, 3), dtype=np.uint8)
8
9 # Add some patterns
10 image[:, :width//3, 0] = 255 # Red section
11 image[:, width//3:2*width//3, 1] = 255 # Green section
12 image[:, 2*width//3:, 2] = 255 # Blue section
13
14 # Add a white circle in the center
15 center_x, center_y = width//2, height//2
16 radius = 50
17 Y, X = np.ogrid[:height, :width]
18 mask = (X - center_x)**2 + (Y - center_y)**2 <= radius**2
19 image[mask] = [255, 255, 255]
20
21 # Display and save
22 plt.figure(figsize=(8, 6))
23 plt.imshow(image)
24 plt.title('Test Image with RGB Stripes and White Circle')
25 plt.axis('off')
26 plt.savefig('test_image.png', dpi=150, bbox_inches='tight')
27 plt.show()
28
29 print(f"Created test image: {width}x{height} pixels")
30 print(f"Image shape: {image.shape}")
31 print(f"Image dtype: {image.dtype}")

```

Kode 9: Test image processing sederhana

#### Dokumentasikan hasil eksekusi:

- Screenshot output dari kedua script di atas

```

(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1> & "D:\00 kuliah s7\multimedia\tugas 1\multimedia-uv\Scripts\python.exe" "d:\00 kuliah s7\multimedia\tugas 1\test_audio.py"
Generated 2s sine wave at 440Hz
Sample rate: 44100Hz
Total samples: 88200
(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1>

```

Gambar 8: Output script Audio

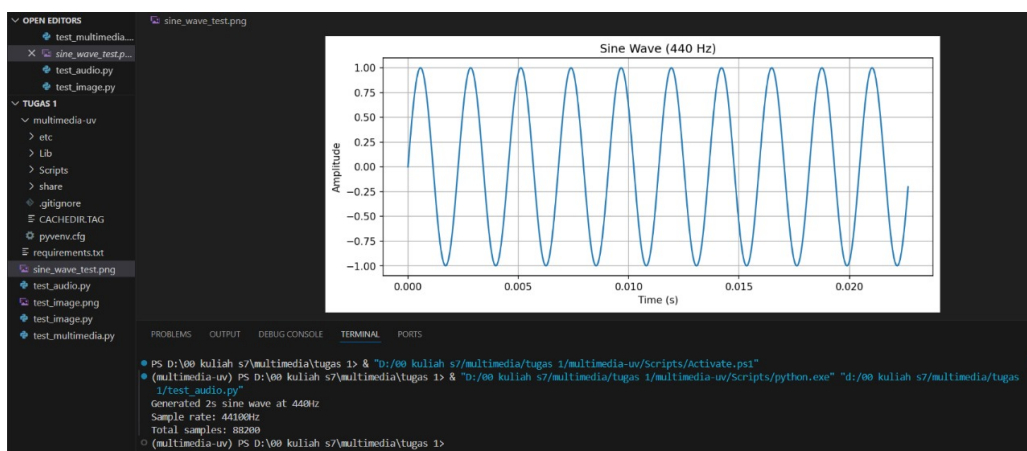
```

(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1> & "D:\00 kuliah s7\multimedia\tugas 1\multimedia-uv\Scripts\python.exe" "d:\00 kuliah s7\multimedia\tugas 1\test_image.py"
Created test image: 400x300 pixels
Image shape: (300, 400, 3)
Image dtype: uint8
(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1>

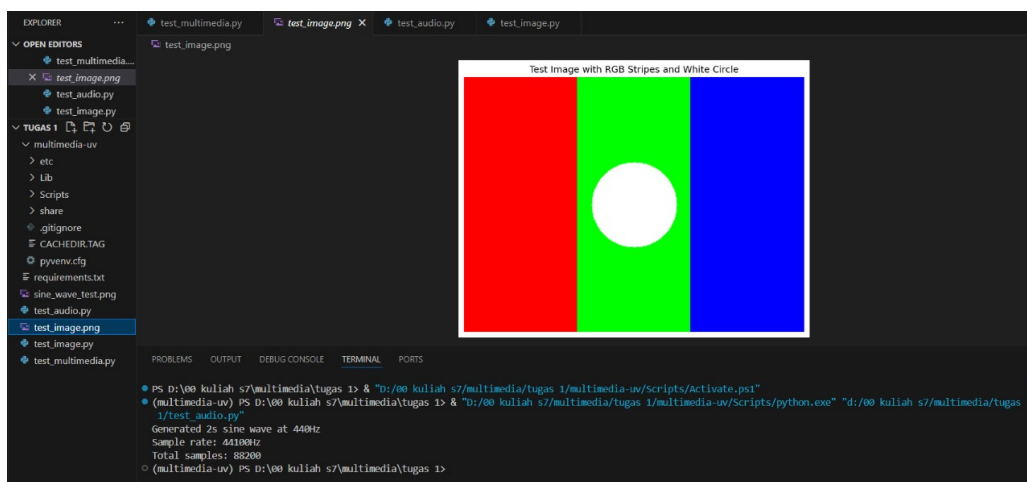
```

Gambar 9: Output script Image

- Gambar yang dihasilkan (sine\_wave\_test.png dan test\_image.png)



Gambar 10: Output Gambar Audio



Gambar 11: Output Gambar Image

- Error message jika ada dan cara mengatasinya

## 4 Bagian Laporan

### 4.1 Output Verifikasi Instalasi



```
1 # check_libs.py
2 print("=== Checking installed libraries ===")
3
4 try:
5     import numpy
6     print("numpy:", numpy.__version__)
7 except ImportError:
8     print("numpy: NOT INSTALLED")
9
10 try:
11     import pandas
12     print("pandas:", pandas.__version__)
13 except ImportError:
14     print("pandas: NOT INSTALLED")
15
16 try:
17     import librosa
18     print("librosa:", librosa.__version__)
19 except ImportError:
20     print("librosa: NOT INSTALLED")
21
22 try:
23     import soundfile
24     print("soundfile:", soundfile.__version__)
25 except ImportError:
26     print("soundfile: NOT INSTALLED")
27
28 try:
29     import scipy
30     print("scipy:", scipy.__version__)
31 except ImportError:
32     print("scipy: NOT INSTALLED")
33
34 try:
35     import cv2
36     print("opencv-python:", cv2.__version__)
37 except ImportError:
38     print("opencv-python: NOT INSTALLED")
39
40 try:
41     import PIL
42     print("Pillow:", PIL.__version__)
43 except ImportError:
44     print("Pillow: NOT INSTALLED")
45
46 try:
47     import skimage
48     print("scikit-image:", skimage.__version__)
49 except ImportError:
50     print("scikit-image: NOT INSTALLED")
51
52 try:
53     import matplotlib
54     print("matplotlib:", matplotlib.__version__)
55 except ImportError:
56     print("matplotlib: NOT INSTALLED")
57
58 try:
59     import moviepy
60     print("moviepy:", moviepy.__version__)
61 except ImportError:
62     print("moviepy: NOT INSTALLED")
```



```
63
64 try:
65     import notebook
66     print("jupyter-notebook:", notebook.__version__)
67 except ImportError:
68     print("jupyter-notebook: NOT INSTALLED")
69
70 print("=== Check complete ===")
```

Kode 10: Kode Yang dibuat untuk verifikasi instalasi di test multimedia py

Copy-paste output lengkap dari script `test_multimedia.py` di sini:

```
1 [
2 numpy: 2.2.6
3 pandas: 2.3.0
4 librosa: 0.11.0
5 soundfile: 0.13.1
6 scipy: 1.16.1
7 opencv-python: 4.12.0
8 Pillow: 11.3.0
9 scikit-image: 0.25.2
10 matplotlib: 3.10.3
11 moviepy: 2.1.2
12 jupyter-notebook: 7.4.5
13 ]
```

Kode 11: Output verifikasi instalasi

## 4.2 Screenshot Hasil Test

Sisipkan screenshot atau gambar hasil dari:

- Terminal/command prompt yang menunjukkan environment aktif

```

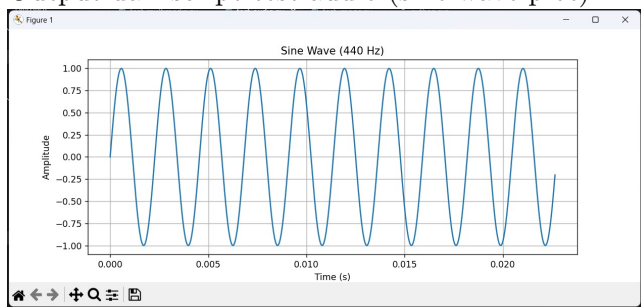
PS D:\00 kuliah s7\multimedia\tugas 1> uv venv multimedia-uv
Using CPython 3.12.10 interpreter at: C:\Users\SACER\AppData\Local\Microsoft\WindowsApps\PythonSoftwareFoundation.Python.3.12_qbz5n2kfra8p0\python.exe
Creating virtual environment at: multimedia-uv
Activate with: multimedia-uv\Scripts\activate
PS D:\00 kuliah s7\multimedia\tugas 1> multimedia-uv\Scripts\activate
(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1> which python
which: no python in the path
which: no python3 in the path
which: no python3.12 in the path
which: no python3.12.10 in the path
which: no python3.12.10.0 in the path
which: no python3.12.10.0 in the path
verify that the path is correct and try again.
At line:1 char:1
+ which python
+ ~~~~~
+ CategoryInfo          : ObjectNotFound: (which:String) [], CommandNotFoundException
+ FullyQualifiedErrorId : CommandNotFoundException

(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1> where python
(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1> Get-Command python

CommandType Name Version Source
-----
Application python.exe 3.12.10... D:\00 kuliah s7\multimedia\tugas 1\multimedia-uv\Scripts\python.exe

```

- Output dari script test audio (sine wave plot)



```

(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1> & "D:\00 kuliah s7\multimedia\tugas 1\multimedia-uv\Scripts\python.exe" "d:\00 kuliah s7\multimedia\tugas 1\test_audio.py"
Generated 2s sine wave at 440Hz
Sample rate: 44100Hz
Total samples: 88200
(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1>

```

- Output dari script test image (RGB stripes dengan circle)



Gunakan perintah `\includegraphics` untuk menyisipkan gambar

### 4.3 Analisis dan Refleksi

Jawab pertanyaan berikut:

1. Mengapa penting menggunakan environment terpisah untuk project multimedia?

*Menurut saya misalnya project saat ini yang saya ingin library x untuk versi 1.x tetapi project lainnya membutuhkan versi 2.x maka otomatis akan tabrakan, dibuatnya environment sendiri untuk mencegah hal seperti itu untuk terjadi agar mereka masing masing punya library sama dengan versi berbeda.*

2. Apa perbedaan utama antara conda, venv, dan uv? Mengapa Anda memilih tool yang Anda gunakan?

*Alasan jujur utama adalah karena tahapan paling mudah diikuti untuk instalasi bagi saya adalah uv lewat bantuan ChatGPT juga. Dan mudahnya uv adalah hanya membuat env kosong -> lalu tinggal instal dengan pip.*

3. Library mana yang paling sulit diinstall dan mengapa?

*Sebenarnya untuk proses instalasi menggunakan pip tidak ada yang rumit hanya berbeda waktu instalasinya. mungkin ini dikarenakan menggunakan uv, masalah yang ditemukan adalah instalasi pada environment yang salah.*

4. Bagaimana cara mengatasi masalah dependency conflict jika terjadi?

*untuk uv, bisa digunakan uv pip check lalu sync requirements.txt untuk disesuaikan. bisa juga menggunakan download versi secara manual atau versi yang diinginkan.*

5. Jelaskan fungsi dari masing-masing library yang berhasil Anda install!

- **librosa**: analisis audio/musik, baca file suara, ekstrak fitur, dan membuat spectrogram.

- **soundfile**: baca/tulis file audio.
- **scipy**: pemrosesan sinyal dan perhitungan ilmiah tambahan.
- **opencv-python**: computer vision, olah citra/video, deteksi objek, deteksi wajah.
- **Pillow**: menambahkan image processing untuk python.
- **scikit-image**: pemrosesan citra ilmiah (segmentasi, transformasi, edge detection).
- **matplotlib**: visualisasi data/gambar dalam bentuk grafik atau plot.
- **moviepy**: edit video sederhana.
- **numpy**: operasi matematika & array multidimensi.
- **pandas**: olah data tabular.
- **jupyter-notebook**: lingkungan interaktif untuk coding dan visualisasi langsung di browser.

#### 4.4 Troubleshooting

Dokumentasikan masalah yang Anda hadapi (jika ada) dan cara mengatasinya:

- **Masalah 1:** *which python tidak bisa digunakan karena tidak ada di versi windows, dan where python tidak ada output*

```
PS D:\00 kuliah s7\multimedia\tugas 1> uv venv multimedia-uv
Using CPython 3.12.10 interpreter at: C:\Users\ACER\AppData\Local\Microsoft\WindowsApps\PythonSoftwareFoundation.Python.3.12_qbz5n2kfra8p0\python.exe
Creating virtual environment at: multimedia-uv
Activate with: multimedia-uv\Scripts\activate
PS D:\00 kuliah s7\multimedia\tugas 1> multimedia-uv\Scripts\activate
(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1> which python
which : The term 'which' is not recognized as the name of a cmdlet, function, script file, or operable program. Check the spelling of the name, or if a path was included,
verify that the path is correct and try again.
At line:1 char:1
+ which python
+ ~~~~~
+ CategoryInfo          : ObjectNotFound: (which:String) [], CommandNotFoundException
+ FullyQualifiedErrorId : CommandNotFoundException

(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1> where python
(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1> Get-Command python
```

CommandType	Name	Version	Source
Application	python.exe	3.12.10...	D:\00 kuliah s7\multimedia\tugas 1\multimedia-uv\Scripts\python.exe

**Solusi:** Menggunakan *where python*, lalu menggunakan *Command-get python* untuk menemukan *source python.exe* nya

- **Masalah 2:** *Sudah pip instal tetapi tidak terdeteksi di environment multimedia-uv*

```
(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1> python test_multimedia.py
>>>
=== Checking installed libraries ===
numpy: NOT INSTALLED
pandas: NOT INSTALLED
librosa: NOT INSTALLED
soundfile: NOT INSTALLED
scipy: NOT INSTALLED
opencv-python: NOT INSTALLED
Pillow: NOT INSTALLED
scikit-image: NOT INSTALLED
matplotlib: NOT INSTALLED
moviepy: NOT INSTALLED
jupyter-notebook: NOT INSTALLED
=== Check complete ===
(multimedia-uv) PS D:\00 kuliah s7\multimedia\tugas 1>
```

**Solusi:** Gunakan command *.\multimedia-uv\Scripts\python.exe -m ensurepip --upgrade* untuk menginstall pip ke dalam folder environment yang benar.

## 5 Export Environment untuk Reproduksi

Sebagai langkah terakhir, export environment Anda agar dapat direproduksi:

### 5.1 Untuk Conda

```
1 conda env export > environment.yml
```

Kode 12: Export conda environment

### 5.2 Untuk venv/uv

```
1 pip freeze > requirements.txt
```

Kode 13: Export pip requirements

Copy-paste isi file environment.yml atau requirements.txt di sini:

```
1 anyio==4.10.0
2 argon2-cffi==25.1.0
3 argon2-cffi-bindings==25.1.0
4 arrow==1.3.0
5 asttokens==3.0.0
6 async-lru==2.0.5
7 attrs==25.3.0
8 audioread==3.0.1
9 babel==2.17.0
10 beautifulsoup4==4.13.5
11 bleach==6.2.0
12 certifi==2025.8.3
13 cffi==1.17.1
14 charset-normalizer==3.4.3
15 colorama==0.4.6
16 comm==0.2.3
17 contourpy==1.3.3
18 cycler==0.12.1
19 debugpy==1.8.16
20 decorator==5.2.1
21 defusedxml==0.7.1
22 executing==2.2.0
23 fastjsonschema==2.21.2
24 fonttools==4.59.1
25 fqdn==1.5.1
26 h11==0.16.0
27 httpcore==1.0.9
28 httpx==0.28.1
29 idna==3.10
30 imageio==2.37.0
31 imageio-ffmpeg==0.6.0
32 ipykernel==6.30.1
33 ipython==9.4.0
34 ipython_pygments_lexers==1.1.1
35 ipywidgets==8.1.7
36 isoduration==20.11.0
37 jedi==0.19.2
38 Jinja2==3.1.6
39 joblib==1.5.1
40 json5==0.12.1
41 jsonpointer==3.0.0
42 jsonschema==4.25.1
43 jsonschema-specifications==2025.4.1
```

```
44 jupyter==1.1.1
45 jupyter-console==6.6.3
46 jupyter-events==0.12.0
47 jupyter-lsp==2.2.6
48 jupyter_client==8.6.3
49 jupyter_core==5.8.1
50 jupyter_server==2.17.0
51 jupyter_server_terminals==0.5.3
52 jupyterlab==4.4.6
53 jupyterlab_pygments==0.3.0
54 jupyterlab_server==2.27.3
55 jupyterlab_widgets==3.0.15
56 kiwisolver==1.4.9
57 lark==1.2.2
58 lazy_loader==0.4
59 librosa==0.11.0
60 llvmlite==0.44.0
61 MarkupSafe==3.0.2
62 matplotlib==3.10.5
63 matplotlib-inline==0.1.7
64 mistune==3.1.3
65 moviepy==2.2.1
66 msgpack==1.1.1
67 nbclient==0.10.2
68 nbconvert==7.16.6
69 nbformat==5.10.4
70 nest-asyncio==1.6.0
71 networkx==3.5
72 notebook==7.4.5
73 notebook_shim==0.2.4
74 numba==0.61.2
75 numpy==2.2.6
76 opencv-python==4.12.0.88
77 packaging==25.0
78 pandas==2.3.2
79 pandocfilters==1.5.1
80 parso==0.8.5
81 pillow==11.3.0
82 platformdirs==4.3.8
83 pooch==1.8.2
84 proglog==0.1.12
85 prometheus_client==0.22.1
86 prompt_toolkit==3.0.51
87 psutil==7.0.0
88 pure_eval==0.2.3
89 pycparser==2.22
90 Pygments==2.19.2
91 pyparsing==3.2.3
92 python-dateutil==2.9.0.post0
93 python-dotenv==1.1.1
94 python-json-logger==3.3.0
95 pytz==2025.2
96 pywin32==311
97 pywinpty==3.0.0
98 PyYAML==6.0.2
99 pyzmq==27.0.2
100 referencing==0.36.2
101 requests==2.32.5
102 rfc3339-validator==0.1.4
103 rfc3986-validator==0.1.1
104 rfc3987-syntax==1.1.0
105 rpds-py==0.27.0
```

```

106  scikit-image==0.25.2
107  scikit-learn==1.7.1
108  scipy==1.16.1
109  Send2Trash==1.8.3
110  setuptools==80.9.0
111  six==1.17.0
112  sniffio==1.3.1
113  soundfile==0.13.1
114  soupsieve==2.7
115  soxr==0.5.0.post1
116  stack-data==0.6.3
117  terminado==0.18.1
118  threadpoolctl==3.6.0
119  tifffile==2025.6.11
120  tinycss2==1.4.0
121  tornado==6.5.2
122  tqdm==4.67.1
123  traitlets==5.14.3
124  types-python-dateutil==2.9.0.20250822
125  typing_extensions==4.15.0
126  tzdata==2025.2
127  uri-template==1.3.0
128  urllib3==2.5.0
129  wcwidth==0.2.13
130  webcolors==24.11.1
131  webencodings==0.5.1
132  websocket-client==1.8.0
133  widgetsnextextension==4.0.14

```

Kode 14: Environment/Requirements file

## 6 Kesimpulan

Tuliskan kesimpulan Anda mengenai:

- Pengalaman setup Python environment untuk multimedia  
*Proses setup ternyata lebih kompleks dari yang dibayangkan. Meskipun sebagian besar library dapat diinstal dengan mudah menggunakan uv, tetap ada beberapa hal teknis yang perlu diperhatikan supaya environmentnya berjalan stabil.*
- Persiapan untuk project multimedia selanjutnya  
*Untuk persiapan project multimedia berikutnya, saya berencana fokus pada augmented reality (AR). Rencana saya adalah mencari referensi fitur-fitur AR yang pernah dibuat sebelumnya.*
- Saran untuk mahasiswa lain yang akan melakukan setup serupa  
*Jangan ragu menonton tutorial di YouTube atau meminta bantuan dari teman yang sudah bisa melakukannya.*

## 7 Referensi

Berikut referensi yang digunakan selama proses setup dan troubleshooting Python environment:

- [ChatGPT - setup uv dan membuat test multimedia py](#)
- [ChatGPT - Troubleshooting "which python" yang tidak bisa bekerja](#)
- [ChatGPT - Troubleshooting isu instalasi Python/UV environment](#)

## References