Nama: **Hizkia Christovita Siahaan (122140110)**   Tugas Ke: **Worksheet 1: Setup Python Environment untuk Multimedia**

Mata Kuliah: **Sistem Teknologi Multimedia (IF25-40305)**   Tanggal: August 29, 2025

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 LaTeX

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 LaTeX 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: [**Menggunakan UV**]

- Screenshot atau copy-paste output dari perintah verifikasi environment

---

Worksheet 1: Setup Python Environment untuk Multimedia

```
1    # PS C:\Semester 7\STM> pip install uv
2    Requirement already satisfied: uv in c:\users\hizkia christovita\appdata\local\programs\
     python\python310\lib\site-packages (0.8.13)
3
4    [notice] A new release of pip is available: 25.1.1 -> 25.2
5    [notice] To update, run: python.exe -m pip install --upgrade pip
6
7    # PS C:\Semester 7\STM> cd Tugas1
8    # PS C:\Semester 7\STM\Tugas1> uv venv Tugas1
9    Using CPython 3.10.2 interpreter at: C:\Users\HIZKIA CHRISTOVITA\AppData\Local\Programs\
     Python\Python310\python.exe
10   Creating virtual environment at: Tugas1
11   Activate with: Tugas1\Scripts\activate
12
13   # PS C:\Semester 7\STM\Tugas1> Tugas1\Scripts\activate
14   # (Tugas1) PS C:\Semester 7\STM\Tugas1> where python
15
```

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   #Library Audio Processing
2   pip install librosa soundfile scipy
3
4   #Library Image Processing
5   pip install opencv-python pillow scikit-image matplotlib
6
7   #Library Video Processing
8   pip install moviepy
9
10  #Library General Purpose
11  pip install numpy pandas jupyter
```

- Screenshot proses instalasi atau output sukses

```
1   #(Tugas1) PS C:\Semester 7\STM\Tugas1> pip install librosa soundfile scipy
2   Collecting librosa
3     Downloading librosa-0.11.0-py3-none-any.whl.metadata (8.7 kB)
4   Collecting soundfile
5     Using cached soundfile-0.13.1-py2.py3-none-win_amd64.whl.metadata (16 kB)
6   Requirement already satisfied: scipy in c:\users\hizkia christovita\appdata\local\programs\
        python\python310\lib\site-packages (1.15.3)
7   Collecting audioread>=2.1.9 (from librosa)
8     Downloading audioread-3.0.1-py3-none-any.whl.metadata (8.4 kB)
9   Collecting numba>=0.51.0 (from librosa)
10    Downloading numba-0.61.2-cp310-cp310-win_amd64.whl.metadata (2.9 kB)
11  Requirement already satisfied: numpy>=1.22.3 in c:\users\hizkia christovita\appdata\local\
        programs\python\python310\lib\site-packages (from librosa) (2.2.3)
12  Collecting scikit-learn>=1.1.0 (from librosa)
13    Downloading scikit_learn-1.7.1-cp310-cp310-win_amd64.whl.metadata (11 kB)
14  Collecting joblib>=1.0 (from librosa)
15    Downloading joblib-1.5.2-py3-none-any.whl.metadata (5.6 kB)
16  Requirement already satisfied: decorator>=4.3.0 in c:\users\hizkia christovita\appdata\
        roaming\python\python310\site-packages (from librosa) (5.2.1)
17  Collecting pooch>=1.1 (from librosa)
18    Downloading pooch-1.8.2-py3-none-any.whl.metadata (10 kB)
19  Collecting soxr>=0.3.2 (from librosa)
20    Downloading soxr-0.5.0.post1-cp310-cp310-win_amd64.whl.metadata (5.6 kB)
21  Requirement already satisfied: typing_extensions>=4.1.1 in c:\users\hizkia christovita\
        appdata\roaming\python\python310\site-packages (from librosa) (4.12.2)
22  Collecting lazy_loader>=0.1 (from librosa)
23    Downloading lazy_loader-0.4-py3-none-any.whl.metadata (7.6 kB)
24  Collecting msgpack>=1.0 (from librosa)
25    Downloading msgpack-1.1.1-cp310-cp310-win_amd64.whl.metadata (8.6 kB)
26  Requirement already satisfied: cffi>=1.0 in c:\users\hizkia christovita\appdata\roaming\
        python\python310\site-packages (from soundfile) (1.17.1)
27  Requirement already satisfied: pycparser in c:\users\hizkia christovita\appdata\roaming\
        python\python310\site-packages (from cffi>=1.0->soundfile) (2.22)
28  Requirement already satisfied: packaging in c:\users\hizkia christovita\appdata\local\
        programs\python\python310\lib\site-packages (from lazy_loader>=0.1->librosa) (24.0)
```

Worksheet 1: Setup Python Environment untuk Multimedia

```
29  Collecting llvmlite<0.45,>=0.44.0dev0 (from numba>=0.51.0->librosa)
30    Downloading llvmlite-0.44.0-cp310-cp310-win_amd64.whl.metadata (5.0 kB)
31  Requirement already satisfied: platformdirs>=2.5.0 in c:\users\hizkia christovita\appdata\
        roaming\python\python310\site-packages (from pooch>=1.1->librosa) (4.3.6)
32  Requirement already satisfied: requests>=2.19.0 in c:\users\hizkia christovita\appdata\local\
        programs\python\python310\lib\site-packages (from pooch>=1.1->librosa) (2.32.3)
33  Requirement already satisfied: charset-normalizer<4,>=2 in c:\users\hizkia christovita\
        appdata\local\programs\python\python310\lib\site-packages (from requests>=2.19.0->pooch
        >=1.1->librosa) (3.4.1)
34  Requirement already satisfied: idna<4,>=2.5 in c:\users\hizkia christovita\appdata\local\
        programs\python\python310\lib\site-packages (from requests>=2.19.0->pooch>=1.1->librosa)
        (3.10)
35  Requirement already satisfied: urllib3<3,>=1.21.1 in c:\users\hizkia christovita\appdata\
        local\programs\python\python310\lib\site-packages (from requests>=2.19.0->pooch>=1.1->
        librosa) (2.3.0)
36  Requirement already satisfied: certifi>=2017.4.17 in c:\users\hizkia christovita\appdata\
        local\programs\python\python310\lib\site-packages (from requests>=2.19.0->pooch>=1.1->
        librosa) (2025.4.26)
37  Collecting threadpoolctl>=3.1.0 (from scikit-learn>=1.1.0->librosa)
38    Downloading threadpoolctl-3.6.0-py3-none-any.whl.metadata (13 kB)
39  Downloading librosa-0.11.0-py3-none-any.whl (260 kB)
40  Using cached soundfile-0.13.1-py2.py3-none-win_amd64.whl (1.0 MB)
41  Downloading audioread-3.0.1-py3-none-any.whl (23 kB)
42  Downloading joblib-1.5.2-py3-none-any.whl (308 kB)
43  Downloading lazy_loader-0.4-py3-none-any.whl (12 kB)
44  Downloading msgpack-1.1.1-cp310-cp310-win_amd64.whl (71 kB)
45  Downloading numba-0.61.2-cp310-cp310-win_amd64.whl (2.8 MB)
46  Downloading llvmlite-0.44.0-cp310-cp310-win_amd64.whl (30.3 MB)
47  Downloading pooch-1.8.2-py3-none-any.whl (64 kB)
48  Downloading scikit_learn-1.7.1-cp310-cp310-win_amd64.whl (8.9 MB)
49  Downloading msgpack-1.1.1-cp310-cp310-win_amd64.whl (71 kB)
50  Downloading numba-0.61.2-cp310-cp310-win_amd64.whl (2.8 MB)
51  Downloading llvmlite-0.44.0-cp310-cp310-win_amd64.whl (30.3 MB)
52  Downloading pooch-1.8.2-py3-none-any.whl (64 kB)
53  Downloading scikit_learn-1.7.1-cp310-cp310-win_amd64.whl (8.9 MB)
54  Downloading llvmlite-0.44.0-cp310-cp310-win_amd64.whl (30.3 MB)
55  Downloading pooch-1.8.2-py3-none-any.whl (64 kB)
56  Downloading scikit_learn-1.7.1-cp310-cp310-win_amd64.whl (8.9 MB)
57  Downloading scikit_learn-1.7.1-cp310-cp310-win_amd64.whl (8.9 MB)
58  Downloading soxr-0.5.0.post1-cp310-cp310-win_amd64.whl (166 kB)
59  Downloading threadpoolctl-3.6.0-py3-none-any.whl (18 kB)
60  Installing collected packages: threadpoolctl, soxr, msgpack, llvmlite, lazy_loader, joblib,
        audioread, soundfile, scikit-learn, pooch, numba, librosa
61  Successfully installed audioread-3.0.1 joblib-1.5.2 lazy_loader-0.4 librosa-0.11.0 llvmlite
        -0.44.0 msgpack-1.1.1 numba-0.61.2 pooch-1.8.2 scikit-learn-1.7.1 soundfile-0.13.1 soxr
        -0.5.0.post1 threadpoolctl-3.6.0
62
63  #(Tugas1) PS C:\Semester 7\STM\Tugas1> pip install opencv-python pillow scikit-image
        matplotlib
64  Collecting opencv-python
65    Downloading opencv_python-4.12.0.88-cp37-abi3-win_amd64.whl.metadata (19 kB)
66  Requirement already satisfied: pillow in c:\users\hizkia christovita\appdata\local\programs\
        python\python310\lib\site-packages (11.1.0)
67  Collecting scikit-image
68    Downloading scikit_image-0.25.2-cp310-cp310-win_amd64.whl.metadata (14 kB)
69  Requirement already satisfied: matplotlib in c:\users\hizkia christovita\appdata\local\
        programs\python\python310\lib\site-packages (3.10.0)
70  Requirement already satisfied: numpy<2.3.0,>=2 in c:\users\hizkia christovita\appdata\local\
        programs\python\python310\lib\site-packages (from opencv-python) (2.2.3)
71  Requirement already satisfied: scipy>=1.11.4 in c:\users\hizkia christovita\appdata\local\
        programs\python\python310\lib\site-packages (from scikit-image) (1.15.3)
72  Collecting networkx>=3.0 (from scikit-image)
```

Worksheet 1: Setup Python Environment untuk Multimedia

```
73    Downloading networkx-3.4.2-py3-none-any.whl.metadata (6.3 kB)
74 Collecting imageio!=2.35.0,>=2.33 (from scikit-image)
75    Downloading imageio-2.37.0-py3-none-any.whl.metadata (5.2 kB)
76 Collecting tifffile>=2022.8.12 (from scikit-image)
77    Downloading tifffile-2025.5.10-py3-none-any.whl.metadata (31 kB)
78 Requirement already satisfied: packaging>=21 in c:\users\hizkia christovita\appdata\local\
       programs\python\python310\lib\site-packages (from scikit-image) (24.0)
79 Requirement already satisfied: lazy-loader>=0.4 in c:\users\hizkia christovita\appdata\local\
       programs\python\python310\lib\site-packages (from scikit-image) (0.4)
80 Requirement already satisfied: contourpy>=1.0.1 in c:\users\hizkia christovita\appdata\local\
       programs\python\python310\lib\site-packages (from matplotlib) (1.3.1)
81 Requirement already satisfied: cycler>=0.10 in c:\users\hizkia christovita\appdata\local\
       programs\python\python310\lib\site-packages (from matplotlib) (0.12.1)
82 Requirement already satisfied: fonttools>=4.22.0 in c:\users\hizkia christovita\appdata\local
       \programs\python\python310\lib\site-packages (from matplotlib) (4.56.0)
83 Requirement already satisfied: kiwisolver>=1.3.1 in c:\users\hizkia christovita\appdata\local
       \programs\python\python310\lib\site-packages (from matplotlib) (1.4.8)
84 Requirement already satisfied: pyparsing>=2.3.1 in c:\users\hizkia christovita\appdata\local\
       programs\python\python310\lib\site-packages (from matplotlib) (3.2.1)
85 Requirement already satisfied: python-dateutil>=2.7 in c:\users\hizkia christovita\appdata\
       roaming\python\python310\site-packages (from matplotlib) (2.9.0.post0)
86 Requirement already satisfied: six>=1.5 in c:\users\hizkia christovita\appdata\roaming\python
       \python310\site-packages (from python-dateutil>=2.7->matplotlib) (1.17.0)
87 Downloading opencv_python-4.12.0.88-cp37-abi3-win_amd64.whl (39.0 MB)
88 Downloading scikit_image-0.25.2-cp310-cp310-win_amd64.whl (12.8 MB)
89 Downloading imageio-2.37.0-py3-none-any.whl (315 kB)
90 Downloading networkx-3.4.2-py3-none-any.whl (1.7 MB)
91 Downloading tifffile-2025.5.10-py3-none-any.whl (226 kB)
92 Installing collected packages: tifffile, opencv-python, networkx, imageio, scikit-image
93 Successfully installed imageio-2.37.0 networkx-3.4.2 opencv-python-4.12.0.88 scikit-image
       -0.25.2 tifffile-2025.5.10
94
95 #(Tugas1) PS C:\Semester 7\STM\Tugas1> pip install moviepy
96 Collecting moviepy
97    Downloading moviepy-2.2.1-py3-none-any.whl.metadata (6.9 kB)
98 Requirement already satisfied: decorator<6.0,>=4.0.2 in c:\users\hizkia christovita\appdata\
       roaming\python\python310\site-packages (from moviepy) (5.2.1)
99 Requirement already satisfied: imageio<3.0,>=2.5 in c:\users\hizkia christovita\appdata\local
       \programs\python\python310\lib\site-packages (from moviepy) (2.37.0)
100 Collecting imageio_ffmpeg>=0.2.0 (from moviepy)
101    Downloading imageio_ffmpeg-0.6.0-py3-none-win_amd64.whl.metadata (1.5 kB)
102 Requirement already satisfied: numpy>=1.25.0 in c:\users\hizkia christovita\appdata\local\
       programs\python\python310\lib\site-packages (from moviepy) (2.2.3)
103 Collecting proglog<=1.0.0 (from moviepy)
104    Downloading proglog-0.1.12-py3-none-any.whl.metadata (794 bytes)
105 Collecting python-dotenv>=0.10 (from moviepy)
106    Downloading python_dotenv-1.1.1-py3-none-any.whl.metadata (24 kB)
107 Requirement already satisfied: pillow<12.0,>=9.2.0 in c:\users\hizkia christovita\appdata\
       local\programs\python\python310\lib\site-packages (from moviepy) (11.1.0)
108 Collecting tqdm (from proglog<=1.0.0->moviepy)
109    Downloading tqdm-4.67.1-py3-none-any.whl.metadata (57 kB)
110 Requirement already satisfied: colorama in c:\users\hizkia christovita\appdata\roaming\python
       \python310\site-packages (from tqdm->proglog<=1.0.0->moviepy) (0.4.6)
111 Downloading moviepy-2.2.1-py3-none-any.whl (129 kB)
112 Downloading proglog-0.1.12-py3-none-any.whl (6.3 kB)
113 Downloading imageio_ffmpeg-0.6.0-py3-none-win_amd64.whl (31.2 MB)
114 Downloading python_dotenv-1.1.1-py3-none-any.whl (20 kB)
115 Downloading tqdm-4.67.1-py3-none-any.whl (78 kB)
116 Installing collected packages: tqdm, python-dotenv, imageio_ffmpeg, proglog, moviepy
117 Successfully installed imageio_ffmpeg-0.6.0 moviepy-2.2.1 proglog-0.1.12 python-dotenv-1.1.1
       tqdm-4.67.1
118
```

Worksheet 1: Setup Python Environment untuk Multimedia

```
119 #(Tugas1) PS C:\Semester 7\STM\Tugas1> pip install numpy pandas jupyter
120 Requirement already satisfied: numpy in c:\users\hizkia christovita\appdata\local\programs\
       python\python310\lib\site-packages (2.2.3)
121 Requirement already satisfied: pandas in c:\users\hizkia christovita\appdata\local\programs\
       python\python310\lib\site-packages (2.2.3)
122 Collecting jupyter
123   Downloading jupyter-1.1.1-py2.py3-none-any.whl.metadata (2.0 kB)
124 Requirement already satisfied: python-dateutil>=2.8.2 in c:\users\hizkia christovita\appdata\
       roaming\python\python310\site-packages (from pandas) (2.9.0.post0)
125 Requirement already satisfied: pytz>=2020.1 in c:\users\hizkia christovita\appdata\local\
       programs\python\python310\lib\site-packages (from pandas) (2025.1)
126 Requirement already satisfied: tzdata>=2022.7 in c:\users\hizkia christovita\appdata\local\
       programs\python\python310\lib\site-packages (from pandas) (2025.1)
127 Requirement already satisfied: notebook in c:\users\hizkia christovita\appdata\roaming\python
       \python310\site-packages (from jupyter) (7.4.3)
128 Collecting jupyter-console (from jupyter)
129   Downloading jupyter_console-6.6.3-py3-none-any.whl.metadata (5.8 kB)
130 Requirement already satisfied: nbconvert in c:\users\hizkia christovita\appdata\roaming\
       python\python310\site-packages (from jupyter) (7.16.6)
131 Requirement already satisfied: ipykernel in c:\users\hizkia christovita\appdata\roaming\
       python\python310\site-packages (from jupyter) (6.29.5)
132 Collecting ipywidgets (from jupyter)
133   Downloading ipywidgets-8.1.7-py3-none-any.whl.metadata (2.4 kB)
134 Requirement already satisfied: jupyterlab in c:\users\hizkia christovita\appdata\roaming\
       python\python310\site-packages (from jupyter) (4.4.3)
135 Requirement already satisfied: six>=1.5 in c:\users\hizkia christovita\appdata\roaming\python
       \python310\site-packages (from python-dateutil>=2.8.2->pandas) (1.17.0)
136 Requirement already satisfied: comm>=0.1.1 in c:\users\hizkia christovita\appdata\roaming\
       python\python310\site-packages (from ipykernel->jupyter) (0.2.2)
137 Requirement already satisfied: debugpy>=1.6.5 in c:\users\hizkia christovita\appdata\roaming\
       python\python310\site-packages (from ipykernel->jupyter) (1.8.12)
138 Requirement already satisfied: ipython>=7.23.1 in c:\users\hizkia christovita\appdata\roaming
       \python\python310\site-packages (from ipykernel->jupyter) (8.32.0)
139 Requirement already satisfied: jupyter-client>=6.1.12 in c:\users\hizkia christovita\appdata\
       roaming\python\python310\site-packages (from ipykernel->jupyter) (7.4.9)
140 Requirement already satisfied: jupyter-core!=5.0.*,>=4.12 in c:\users\hizkia christovita\
       appdata\roaming\python\python310\site-packages (from ipykernel->jupyter) (5.7.2)
141 Requirement already satisfied: matplotlib-inline>=0.1 in c:\users\hizkia christovita\appdata\
       roaming\python\python310\site-packages (from ipykernel->jupyter) (0.1.7)
142 Requirement already satisfied: nest-asyncio in c:\users\hizkia christovita\appdata\roaming\
       python\python310\site-packages (from ipykernel->jupyter) (1.6.0)
143 Requirement already satisfied: packaging in c:\users\hizkia christovita\appdata\local\
       programs\python\python310\lib\site-packages (from ipykernel->jupyter) (24.0)
144 Requirement already satisfied: psutil in c:\users\hizkia christovita\appdata\roaming\python\
       python310\site-packages (from ipykernel->jupyter) (7.0.0)
145 Requirement already satisfied: pyzmq>=24 in c:\users\hizkia christovita\appdata\roaming\
       python\python310\site-packages (from ipykernel->jupyter) (24.0.1)
146 Requirement already satisfied: tornado>=6.1 in c:\users\hizkia christovita\appdata\roaming\
       python\python310\site-packages (from ipykernel->jupyter) (6.4.2)
147 Requirement already satisfied: traitlets>=5.4.0 in c:\users\hizkia christovita\appdata\
       roaming\python\python310\site-packages (from ipykernel->jupyter) (5.14.3)
148 Requirement already satisfied: colorama in c:\users\hizkia christovita\appdata\roaming\python
       \python310\site-packages (from ipython>=7.23.1->ipykernel->jupyter) (0.4.6)
149 Requirement already satisfied: decorator in c:\users\hizkia christovita\appdata\roaming\
       python\python310\site-packages (from ipython>=7.23.1->ipykernel->jupyter) (5.2.1)
150 Requirement already satisfied: exceptiongroup in c:\users\hizkia christovita\appdata\roaming\
       python\python310\site-packages (from ipython>=7.23.1->ipykernel->jupyter) (1.2.2)
151 Requirement already satisfied: jedi>=0.16 in c:\users\hizkia christovita\appdata\roaming\
       python\python310\site-packages (from ipython>=7.23.1->ipykernel->jupyter) (0.19.2)
152 Requirement already satisfied: prompt_toolkit<3.1.0,>=3.0.41 in c:\users\hizkia christovita\
       appdata\roaming\python\python310\site-packages (from ipython>=7.23.1->ipykernel->jupyter)
        (3.0.50)
```

Worksheet 1: Setup Python Environment untuk Multimedia

```
153 Requirement already satisfied: pygments>=2.4.0 in c:\users\hizkia christovita\appdata\roaming
        \python\python310\site-packages (from ipython>=7.23.1->ipykernel->jupyter) (2.19.1)
154 Requirement already satisfied: stack_data in c:\users\hizkia christovita\appdata\roaming\
        python\python310\site-packages (from ipython>=7.23.1->ipykernel->jupyter) (0.6.3)
155 Requirement already satisfied: typing_extensions>=4.6 in c:\users\hizkia christovita\appdata\
        roaming\python\python310\site-packages (from ipython>=7.23.1->ipykernel->jupyter)
        (4.12.2)
156 Requirement already satisfied: wcwidth in c:\users\hizkia christovita\appdata\roaming\python\
        python310\site-packages (from prompt_toolkit<3.1.0,>=3.0.41->ipython>=7.23.1->ipykernel->
        jupyter) (0.2.13)
157 Requirement already satisfied: parso<0.9.0,>=0.8.4 in c:\users\hizkia christovita\appdata\
        roaming\python\python310\site-packages (from jedi>=0.16->ipython>=7.23.1->ipykernel->
        jupyter) (0.8.4)
158 Requirement already satisfied: entrypoints in c:\users\hizkia christovita\appdata\roaming\
        python\python310\site-packages (from jupyter-client>=6.1.12->ipykernel->jupyter) (0.4)
159 Requirement already satisfied: platformdirs>=2.5 in c:\users\hizkia christovita\appdata\
        roaming\python\python310\site-packages (from jupyter-core!=5.0.*,>=4.12->ipykernel->
        jupyter) (4.3.6)
160 Requirement already satisfied: pywin32>=300 in c:\users\hizkia christovita\appdata\roaming\
        python\python310\site-packages (from jupyter-core!=5.0.*,>=4.12->ipykernel->jupyter)
        (308)
161 Collecting widgetsnbextension~=4.0.14 (from ipywidgets->jupyter)
162   Downloading widgetsnbextension-4.0.14-py3-none-any.whl.metadata (1.6 kB)
163 Collecting jupyterlab_widgets~=3.0.15 (from ipywidgets->jupyter)
164   Downloading jupyterlab_widgets-3.0.15-py3-none-any.whl.metadata (20 kB)
165 Requirement already satisfied: async-lru>=1.0.0 in c:\users\hizkia christovita\appdata\
        roaming\python\python310\site-packages (from jupyterlab->jupyter) (2.0.5)
166 Requirement already satisfied: httpx>=0.25.0 in c:\users\hizkia christovita\appdata\roaming\
        python\python310\site-packages (from jupyterlab->jupyter) (0.28.1)
167 Requirement already satisfied: jinja2>=3.0.3 in c:\users\hizkia christovita\appdata\roaming\
        python\python310\site-packages (from jupyterlab->jupyter) (3.1.6)
168 Requirement already satisfied: jupyter-lsp>=2.0.0 in c:\users\hizkia christovita\appdata\
        roaming\python\python310\site-packages (from jupyterlab->jupyter) (2.2.5)
169 Requirement already satisfied: jupyter-server<3,>=2.4.0 in c:\users\hizkia christovita\
        appdata\roaming\python\python310\site-packages (from jupyterlab->jupyter) (2.16.0)
170 Requirement already satisfied: jupyterlab-server<3,>=2.27.1 in c:\users\hizkia christovita\
        appdata\roaming\python\python310\site-packages (from jupyterlab->jupyter) (2.27.3)
171 Requirement already satisfied: notebook-shim>=0.2 in c:\users\hizkia christovita\appdata\
        roaming\python\python310\site-packages (from jupyterlab->jupyter) (0.2.4)
172 Requirement already satisfied: setuptools>=41.1.0 in c:\users\hizkia christovita\appdata\
        local\programs\python\python310\lib\site-packages (from jupyterlab->jupyter) (80.4.0)
173 Requirement already satisfied: tomli>=1.2.2 in c:\users\hizkia christovita\appdata\roaming\
        python\python310\site-packages (from jupyterlab->jupyter) (2.2.1)
174 Requirement already satisfied: anyio>=3.1.0 in c:\users\hizkia christovita\appdata\roaming\
        python\python310\site-packages (from jupyter-server<3,>=2.4.0->jupyterlab->jupyter)
        (4.9.0)
175 Requirement already satisfied: argon2-cffi>=21.1 in c:\users\hizkia christovita\appdata\
        roaming\python\python310\site-packages (from jupyter-server<3,>=2.4.0->jupyterlab->
        jupyter) (23.1.0)
176 Requirement already satisfied: jupyter-events>=0.11.0 in c:\users\hizkia christovita\appdata\
        roaming\python\python310\site-packages (from jupyter-server<3,>=2.4.0->jupyterlab->
        jupyter) (0.12.0)
177 Requirement already satisfied: jupyter-server-terminals>=0.4.4 in c:\users\hizkia christovita
        \appdata\roaming\python\python310\site-packages (from jupyter-server<3,>=2.4.0->
        jupyterlab->jupyter) (0.5.3)
178 Requirement already satisfied: nbformat>=5.3.0 in c:\users\hizkia christovita\appdata\roaming
        \python\python310\site-packages (from jupyter-server<3,>=2.4.0->jupyterlab->jupyter)
        (5.10.4)
179 Requirement already satisfied: overrides>=5.0 in c:\users\hizkia christovita\appdata\roaming\
        python\python310\site-packages (from jupyter-server<3,>=2.4.0->jupyterlab->jupyter)
        (7.7.0)
180 Requirement already satisfied: prometheus-client>=0.9 in c:\users\hizkia christovita\appdata\
```

Worksheet 1: Setup Python Environment untuk Multimedia

```
     roaming\python\python310\site-packages (from jupyter-server<3,>=2.4.0->jupyterlab->
     jupyter) (0.22.0)
181 Requirement already satisfied: pywinpty>=2.0.1 in c:\users\hizkia christovita\appdata\roaming
     \python\python310\site-packages (from jupyter-server<3,>=2.4.0->jupyterlab->jupyter)
     (2.0.15)
182 Requirement already satisfied: send2trash>=1.8.2 in c:\users\hizkia christovita\appdata\
     roaming\python\python310\site-packages (from jupyter-server<3,>=2.4.0->jupyterlab->
     jupyter) (1.8.3)
183 Requirement already satisfied: terminado>=0.8.3 in c:\users\hizkia christovita\appdata\
     roaming\python\python310\site-packages (from jupyter-server<3,>=2.4.0->jupyterlab->
     jupyter) (0.18.1)
184 Requirement already satisfied: websocket-client>=1.7 in c:\users\hizkia christovita\appdata\
     roaming\python\python310\site-packages (from jupyter-server<3,>=2.4.0->jupyterlab->
     jupyter) (1.8.0)
185 Requirement already satisfied: babel>=2.10 in c:\users\hizkia christovita\appdata\roaming\
     python\python310\site-packages (from jupyterlab-server<3,>=2.27.1->jupyterlab->jupyter)
     (2.17.0)
186 Requirement already satisfied: json5>=0.9.0 in c:\users\hizkia christovita\appdata\roaming\
     python\python310\site-packages (from jupyterlab-server<3,>=2.27.1->jupyterlab->jupyter)
     (0.12.0)
187 Requirement already satisfied: jsonschema>=4.18.0 in c:\users\hizkia christovita\appdata\
     roaming\python\python310\site-packages (from jupyterlab-server<3,>=2.27.1->jupyterlab->
     jupyter) (4.24.0)
188 Requirement already satisfied: requests>=2.31 in c:\users\hizkia christovita\appdata\local\
     programs\python\python310\lib\site-packages (from jupyterlab-server<3,>=2.27.1->
     jupyterlab->jupyter) (2.32.3)
189 Requirement already satisfied: idna>=2.8 in c:\users\hizkia christovita\appdata\local\
     programs\python\python310\lib\site-packages (from anyio>=3.1.0->jupyter-server
     <3,>=2.4.0->jupyterlab->jupyter) (3.10)
190 Requirement already satisfied: sniffio>=1.1 in c:\users\hizkia christovita\appdata\roaming\
     python\python310\site-packages (from anyio>=3.1.0->jupyter-server<3,>=2.4.0->jupyterlab->
     jupyter) (1.3.1)
191 Requirement already satisfied: argon2-cffi-bindings in c:\users\hizkia christovita\appdata\
     roaming\python\python310\site-packages (from argon2-cffi>=21.1->jupyter-server
     <3,>=2.4.0->jupyterlab->jupyter) (21.2.0)
192 Requirement already satisfied: certifi in c:\users\hizkia christovita\appdata\local\programs\
     python\python310\lib\site-packages (from httpx>=0.25.0->jupyterlab->jupyter) (2025.4.26)
193 Requirement already satisfied: httpcore==1.* in c:\users\hizkia christovita\appdata\roaming\
     python\python310\site-packages (from httpx>=0.25.0->jupyterlab->jupyter) (1.0.9)
194 Requirement already satisfied: h11>=0.16 in c:\users\hizkia christovita\appdata\roaming\
     python\python310\site-packages (from httpcore==1.*->httpx>=0.25.0->jupyterlab->jupyter)
     (0.16.0)
195 Requirement already satisfied: MarkupSafe>=2.0 in c:\users\hizkia christovita\appdata\roaming
     \python\python310\site-packages (from jinja2>=3.0.3->jupyterlab->jupyter) (3.0.2)
196 Requirement already satisfied: attrs>=22.2.0 in c:\users\hizkia christovita\appdata\local\
     programs\python\python310\lib\site-packages (from jsonschema>=4.18.0->jupyterlab-server
     <3,>=2.27.1->jupyterlab->jupyter) (25.1.0)
197 Requirement already satisfied: jsonschema-specifications>=2023.03.6 in c:\users\hizkia
     christovita\appdata\roaming\python\python310\site-packages (from jsonschema>=4.18.0->
     jupyterlab-server<3,>=2.27.1->jupyterlab->jupyter) (2025.4.1)
198 Requirement already satisfied: referencing>=0.28.4 in c:\users\hizkia christovita\appdata\
     roaming\python\python310\site-packages (from jsonschema>=4.18.0->jupyterlab-server
     <3,>=2.27.1->jupyterlab->jupyter) (0.36.2)
199 Requirement already satisfied: rpds-py>=0.7.1 in c:\users\hizkia christovita\appdata\roaming\
     python\python310\site-packages (from jsonschema>=4.18.0->jupyterlab-server<3,>=2.27.1->
     jupyterlab->jupyter) (0.25.1)
200 Requirement already satisfied: python-json-logger>=2.0.4 in c:\users\hizkia christovita\
     appdata\roaming\python\python310\site-packages (from jupyter-events>=0.11.0->jupyter-
     server<3,>=2.4.0->jupyterlab->jupyter) (3.3.0)
201 Requirement already satisfied: pyyaml>=5.3 in c:\users\hizkia christovita\appdata\roaming\
     python\python310\site-packages (from jupyter-events>=0.11.0->jupyter-server<3,>=2.4.0->
     jupyterlab->jupyter) (6.0.2)
```

Worksheet 1: Setup Python Environment untuk Multimedia

```
202  Requirement already satisfied: rfc3339-validator in c:\users\hizkia christovita\appdata\
         roaming\python\python310\site-packages (from jupyter-events>=0.11.0->jupyter-server
         <3,>=2.4.0->jupyterlab->jupyter) (0.1.4)
203  Requirement already satisfied: rfc3986-validator>=0.1.1 in c:\users\hizkia christovita\
         appdata\roaming\python\python310\site-packages (from jupyter-events>=0.11.0->jupyter-
         server<3,>=2.4.0->jupyterlab->jupyter) (0.1.1)
204  Requirement already satisfied: fqdn in c:\users\hizkia christovita\appdata\roaming\python\
         python310\site-packages (from jsonschema[format-nongpl]>=4.18.0->jupyter-events>=0.11.0->
         jupyter-server<3,>=2.4.0->jupyterlab->jupyter) (1.5.1)
205  Requirement already satisfied: isoduration in c:\users\hizkia christovita\appdata\roaming\
         python\python310\site-packages (from jsonschema[format-nongpl]>=4.18.0->jupyter-events
         >=0.11.0->jupyter-server<3,>=2.4.0->jupyterlab->jupyter) (20.11.0)
206  Requirement already satisfied: jsonpointer>1.13 in c:\users\hizkia christovita\appdata\
         roaming\python\python310\site-packages (from jsonschema[format-nongpl]>=4.18.0->jupyter-
         events>=0.11.0->jupyter-server<3,>=2.4.0->jupyterlab->jupyter) (3.0.0)
207  Requirement already satisfied: uri-template in c:\users\hizkia christovita\appdata\roaming\
         python\python310\site-packages (from jsonschema[format-nongpl]>=4.18.0->jupyter-events
         >=0.11.0->jupyter-server<3,>=2.4.0->jupyterlab->jupyter) (1.3.0)
208  Requirement already satisfied: webcolors>=24.6.0 in c:\users\hizkia christovita\appdata\
         roaming\python\python310\site-packages (from jsonschema[format-nongpl]>=4.18.0->jupyter-
         events>=0.11.0->jupyter-server<3,>=2.4.0->jupyterlab->jupyter) (24.11.1)
209  Requirement already satisfied: beautifulsoup4 in c:\users\hizkia christovita\appdata\local\
         programs\python\python310\lib\site-packages (from nbconvert->jupyter) (4.13.4)
210  Requirement already satisfied: bleach!=5.0.0 in c:\users\hizkia christovita\appdata\roaming\
         python\python310\site-packages (from bleach[css]!=5.0.0->nbconvert->jupyter) (6.2.0)
211  Requirement already satisfied: defusedxml in c:\users\hizkia christovita\appdata\roaming\
         python\python310\site-packages (from nbconvert->jupyter) (0.7.1)
212  Requirement already satisfied: jupyterlab-pygments in c:\users\hizkia christovita\appdata\
         roaming\python\python310\site-packages (from nbconvert->jupyter) (0.3.0)
213  Requirement already satisfied: mistune<4,>=2.0.3 in c:\users\hizkia christovita\appdata\
         roaming\python\python310\site-packages (from nbconvert->jupyter) (3.1.3)
214  Requirement already satisfied: nbclient>=0.5.0 in c:\users\hizkia christovita\appdata\roaming
         \python\python310\site-packages (from nbconvert->jupyter) (0.10.2)
215  Requirement already satisfied: pandocfilters>=1.4.1 in c:\users\hizkia christovita\appdata\
         roaming\python\python310\site-packages (from nbconvert->jupyter) (1.5.1)
216  Requirement already satisfied: webencodings in c:\users\hizkia christovita\appdata\roaming\
         python\python310\site-packages (from bleach!=5.0.0->bleach[css]!=5.0.0->nbconvert->
         jupyter) (0.5.1)
217  Requirement already satisfied: tinycss2<1.5,>=1.1.0 in c:\users\hizkia christovita\appdata\
         roaming\python\python310\site-packages (from bleach[css]!=5.0.0->nbconvert->jupyter)
         (1.4.0)
218  Requirement already satisfied: fastjsonschema>=2.15 in c:\users\hizkia christovita\appdata\
         roaming\python\python310\site-packages (from nbformat>=5.3.0->jupyter-server<3,>=2.4.0->
         jupyterlab->jupyter) (2.21.1)
219  Requirement already satisfied: charset-normalizer<4,>=2 in c:\users\hizkia christovita\
         appdata\local\programs\python\python310\lib\site-packages (from requests>=2.31->
         jupyterlab-server<3,>=2.27.1->jupyterlab->jupyter) (3.4.1)
220  Requirement already satisfied: urllib3<3,>=1.21.1 in c:\users\hizkia christovita\appdata\
         local\programs\python\python310\lib\site-packages (from requests>=2.31->jupyterlab-server
         <3,>=2.27.1->jupyterlab->jupyter) (2.3.0)
221  Requirement already satisfied: cffi>=1.0.1 in c:\users\hizkia christovita\appdata\roaming\
         python\python310\site-packages (from argon2-cffi-bindings->argon2-cffi>=21.1->jupyter-
         server<3,>=2.4.0->jupyterlab->jupyter) (1.17.1)
222  Requirement already satisfied: pycparser in c:\users\hizkia christovita\appdata\roaming\
         python\python310\site-packages (from cffi>=1.0.1->argon2-cffi-bindings->argon2-cffi
         >=21.1->jupyter-server<3,>=2.4.0->jupyterlab->jupyter) (2.22)
223  Requirement already satisfied: soupsieve>1.2 in c:\users\hizkia christovita\appdata\local\
         programs\python\python310\lib\site-packages (from beautifulsoup4->nbconvert->jupyter)
         (2.7)
224  Requirement already satisfied: arrow>=0.15.0 in c:\users\hizkia christovita\appdata\roaming\
         python\python310\site-packages (from isoduration->jsonschema[format-nongpl]>=4.18.0->
         jupyter-events>=0.11.0->jupyter-server<3,>=2.4.0->jupyterlab->jupyter) (1.3.0)
```

Worksheet 1: Setup Python Environment untuk Multimedia

```
225 Requirement already satisfied: types-python-dateutil>=2.8.10 in c:\users\hizkia christovita\
        appdata\roaming\python\python310\site-packages (from arrow>=0.15.0->isoduration->
        jsonschema[format-nongpl]>=4.18.0->jupyter-events>=0.11.0->jupyter-server<3,>=2.4.0->
        jupyterlab->jupyter) (2.9.0.20250516)
226 Requirement already satisfied: executing>=1.2.0 in c:\users\hizkia christovita\appdata\
        roaming\python\python310\site-packages (from stack_data->ipython>=7.23.1->ipykernel->
        jupyter) (2.2.0)
227 Requirement already satisfied: asttokens>=2.1.0 in c:\users\hizkia christovita\appdata\
        roaming\python\python310\site-packages (from stack_data->ipython>=7.23.1->ipykernel->
        jupyter) (3.0.0)
228 Requirement already satisfied: pure-eval in c:\users\hizkia christovita\appdata\roaming\
        python\python310\site-packages (from stack_data->ipython>=7.23.1->ipykernel->jupyter)
        (0.2.3)
229 Downloading jupyter-1.1.1-py2.py3-none-any.whl (2.7 kB)
230 Downloading ipywidgets-8.1.7-py3-none-any.whl (139 kB)
231 Downloading jupyterlab_widgets-3.0.15-py3-none-any.whl (216 kB)
232 Downloading widgetsnbextension-4.0.14-py3-none-any.whl (2.2 MB)
233 Downloading jupyter_console-6.6.3-py3-none-any.whl (24 kB)
234 Installing collected packages: widgetsnbextension, jupyterlab_widgets, ipywidgets, jupyter-
        console, jupyter
235 Successfully installed ipywidgets-8.1.7 jupyter-1.1.1 jupyter-console-6.6.3
        jupyterlab_widgets-3.0.15 widgetsnbextension-4.0.14
```

- Daftar library yang berhasil diinstall dengan versinya

```
 1 #(Tugas1) PS C:\Semester 7\STM\Tugas1> uv pip install librosa soundfile scipy
 2 Using Python 3.10.2 environment at: Tugas1
 3 Resolved 25 packages in 5.08s
 4 Prepared 25 packages in 23.74s
 5 Installed 25 packages in 1.77s
 6  + audioread==3.0.1
 7  + certifi==2025.8.3
 8  + cffi==1.17.1
 9  + charset-normalizer==3.4.3
10  + decorator==5.2.1
11  + idna==3.10
12  + joblib==1.5.2
13  + lazy-loader==0.4
14  + librosa==0.11.0
15  + llvmlite==0.44.0
16  + msgpack==1.1.1
17  + numba==0.61.2
18  + numpy==2.2.6
19  + packaging==25.0
20  + platformdirs==4.4.0
21  + pooch==1.8.2
22  + pycparser==2.22
23  + requests==2.32.5
24  + scikit-learn==1.7.1
25  + scipy==1.15.3
26  + soundfile==0.13.1
27  + soxr==0.5.0.post1
28  + threadpoolctl==3.6.0
29  + typing-extensions==4.15.0
30  + urllib3==2.5.0
31
32 #(Tugas1) PS C:\Semester 7\STM\Tugas1> uv pip install opencv-python pillow scikit-image
        matplotlib
33 Using Python 3.10.2 environment at: Tugas1
34 Resolved 18 packages in 2.96s
35 Prepared 14 packages in 19.03s
36 Installed 14 packages in 966ms
```

Worksheet 1: Setup Python Environment untuk Multimedia

```
37  + contourpy==1.3.2
38  + cycler==0.12.1
39  + fonttools==4.59.2
40  + imageio==2.37.0
41  + kiwisolver==1.4.9
42  + matplotlib==3.10.5
43  + networkx==3.4.2
44  + opencv-python==4.12.0.88
45  + pillow==11.3.0
46  + pyparsing==3.2.3
47  + python-dateutil==2.9.0.post0
48  + scikit-image==0.25.2
49  + six==1.17.0
50  + tifffile==2025.5.10
51
52  #(Tugas1) PS C:\Semester 7\STM\Tugas1> uv pip install moviepy
53  Using Python 3.10.2 environment at: Tugas1
54  Resolved 10 packages in 816ms
55  Prepared 6 packages in 5.89s
56  Installed 6 packages in 111ms
57  + colorama==0.4.6
58  + imageio-ffmpeg==0.6.0
59  + moviepy==2.2.1
60  + proglog==0.1.12
61  + python-dotenv==1.1.1
62  + tqdm==4.67.1
63
64  #(Tugas1) PS C:\Semester 7\STM\Tugas1> uv pip install numpy pandas jupyter
65  Using Python 3.10.2 environment at: Tugas1
66  Resolved 105 packages in 4.25s
67  Prepared 90 packages in 35.20s
68  Installed 90 packages in 6.09s
69  + anyio==4.10.0
70  + argon2-cffi==25.1.0
71  + argon2-cffi-bindings==25.1.0
72  + arrow==1.3.0
73  + asttokens==3.0.0
74  + async-lru==2.0.5
75  + attrs==25.3.0
76  + babel==2.17.0
77  + beautifulsoup4==4.13.5
78  + bleach==6.2.0
79  + comm==0.2.3
80  + debugpy==1.8.16
81  + defusedxml==0.7.1
82  + exceptiongroup==1.3.0
83  + executing==2.2.0
84  + fastjsonschema==2.21.2
85  + fqdn==1.5.1
86  + h11==0.16.0
87  + httpcore==1.0.9
88  + httpx==0.28.1
89  + ipykernel==6.30.1
90  + ipython==8.37.0
91  + ipywidgets==8.1.7
92  + isoduration==20.11.0
93  + jedi==0.19.2
94  + jinja2==3.1.6
95  + json5==0.12.1
96  + jsonpointer==3.0.0
97  + jsonschema==4.25.1
98  + jsonschema-specifications==2025.4.1
```

Worksheet 1: Setup Python Environment untuk Multimedia

```
 99   + jupyter==1.1.1
100   + jupyter-client==8.6.3
101   + jupyter-console==6.6.3
102   + jupyter-core==5.8.1
103   + jupyter-events==0.12.0
104   + jupyter-lsp==2.3.0
105   + jupyter-server==2.17.0
106   + jupyter-server-terminals==0.5.3
107   + jupyterlab==4.4.6
108   + jupyterlab-pygments==0.3.0
109   + jupyterlab-server==2.27.3
110   + jupyterlab-widgets==3.0.15
111   + lark==1.2.2
112   + markupsafe==3.0.2
113   + matplotlib-inline==0.1.7
114   + mistune==3.1.3
115   + nbclient==0.10.2
116   + nbconvert==7.16.6
117   + nbformat==5.10.4
118   + nest-asyncio==1.6.0
119   + notebook==7.4.5
120   + notebook-shim==0.2.4
121   + overrides==7.7.0
122   + pandas==2.3.2
123   + pandocfilters==1.5.1
124   + parso==0.8.5
125   + prometheus-client==0.22.1
126   + prompt-toolkit==3.0.52
127   + psutil==7.0.0
128   + pure-eval==0.2.3
129   + pygments==2.19.2
130   + python-json-logger==3.3.0
131   + pytz==2025.2
132   + pywin32==311
133   + pywinpty==3.0.0
134   + pyyaml==6.0.2
135   + pyzmq==27.0.2
136   + referencing==0.36.2
137   + rfc3339-validator==0.1.4
138   + rfc3986-validator==0.1.1
139   + rfc3987-syntax==1.1.0
140   + rpds-py==0.27.1
141   + send2trash==1.8.3
142   + setuptools==80.9.0
143   + sniffio==1.3.1
144   + soupsieve==2.8
145   + stack-data==0.6.3
146   + terminado==0.18.1
147   + tinycss2==1.4.0
148   + tomli==2.2.1
149   + tornado==6.5.2
150   + traitlets==5.14.3
151   + types-python-dateutil==2.9.0.20250822
152   + tzdata==2025.2
153   + uri-template==1.3.0
154   + wcwidth==0.2.13
155   + webcolors==24.11.1
156   + webencodings==0.5.1
157   + websocket-client==1.8.0
158   + widgetsnbextension==4.0.14
```

Worksheet 1: Setup Python Environment untuk Multimedia

3.4   Bagian 3: Verifikasi Instalasi

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

```python
# Verifikasi Instalasi

print("=== Verifikasi Library Tugas1 ===")

try:
    import numpy as np
    import pandas as pd
    import scipy
    import librosa
    import soundfile as sf
    import cv2
    from PIL import Image
    import skimage
    import matplotlib.pyplot as plt
    import moviepy as mp
    import sklearn
    import jupyter

    print("[OK] Semua library berhasil diimport!!")
except ImportError as e:
    print(f"[ERROR] Gagal import: {e}")
```

Kode 8: Test Verifikasi Instalasi Sederhana

Jalankan script dan dokumentasikan hasilnya:

3.5   Bagian 4: Simple Test dengan Sample Code

Buat dan jalankan contoh sederhana untuk setiap kategori multimedia:

3.5.1   Test Audio Processing

```python
import numpy as np
import matplotlib.pyplot as plt

# Generate simple sine wave
duration = 2  # seconds
sample_rate = 44100
frequency = 440  # A4 note

t = np.linspace(0, duration, int(sample_rate * duration))
audio_signal = np.sin(2 * np.pi * frequency * t)

# Plot waveform
plt.figure(figsize=(10, 4))
plt.plot(t[:1000], audio_signal[:1000])  # Plot first 1000 samples
plt.title('Sine Wave (440 Hz)')
plt.xlabel('Time (s)')
plt.ylabel('Amplitude')
plt.grid(True)
plt.savefig('sine_wave_test.png', dpi=150, bbox_inches='tight')
plt.show()

print(f"Generated {duration}s sine wave at {frequency}Hz")
print(f"Sample rate: {sample_rate}Hz")
print(f"Total samples: {len(audio_signal)}")
```

Kode 9: Test audio processing sederhana

Worksheet 1: Setup Python Environment untuk Multimedia

3.5.2   Test Image Processing

```python
import numpy as np
import matplotlib.pyplot as plt
from PIL import Image

# Create a simple test image
width, height = 400, 300
image = np.zeros((height, width, 3), dtype=np.uint8)

# Add some patterns
image[:, :width//3, 0] = 255  # Red section
image[:, width//3:2*width//3, 1] = 255  # Green section
image[:, 2*width//3:, 2] = 255  # Blue section

# Add a white circle in the center
center_x, center_y = width//2, height//2
radius = 50
Y, X = np.ogrid[:height, :width]
mask = (X - center_x)**2 + (Y - center_y)**2 <= radius**2
image[mask] = [255, 255, 255]

# Display and save
plt.figure(figsize=(8, 6))
plt.imshow(image)
plt.title('Test Image with RGB Stripes and White Circle')
plt.axis('off')
plt.savefig('test_image.png', dpi=150, bbox_inches='tight')
plt.show()

print(f"Created test image: {width}x{height} pixels")
print(f"Image shape: {image.shape}")
print(f"Image dtype: {image.dtype}")
```

Kode 10: Test image processing sederhana

Dokumentasikan hasil eksekusi:

- Screenshot output dari kedua script di atas

- Gambar yang dihasilkan (sine_wave_test.png dan test_image.png)

- Error message jika ada dan cara mengatasinya

4   Bagian Laporan

4.1   Output Verifikasi Instalasi

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

```
#(Tugas1) PS C:\Semester 7\STM\Tugas1> python test_multimedia.py
=== Verifikasi Library Tugas1 ===
[OK] Semua library berhasil diimport!!
Generated 2s sine wave at 440Hz
Sample rate: 44100Hz
Total samples: 88200
Created test image: 400x300 pixels
Image shape: (300, 400, 3)
Image dtype: uint8
```
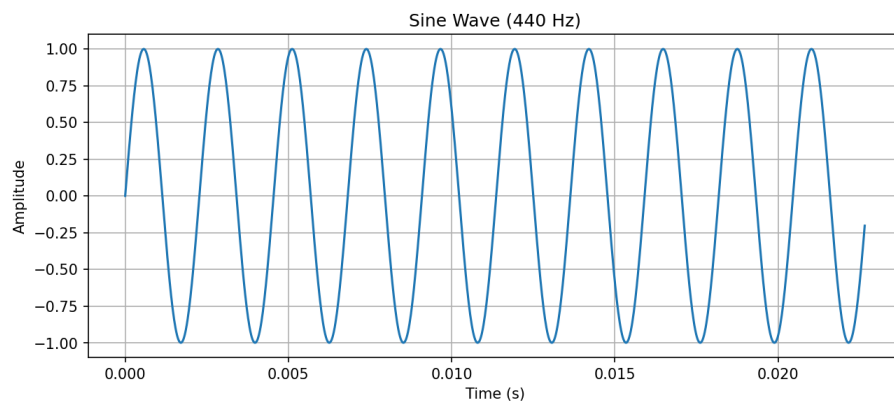
Kode 11: Output verifikasi instalasi

Worksheet 1: Setup Python Environment untuk Multimedia

4.2   Screenshot Hasil Test

Sisipkan screenshot atau gambar hasil dari:

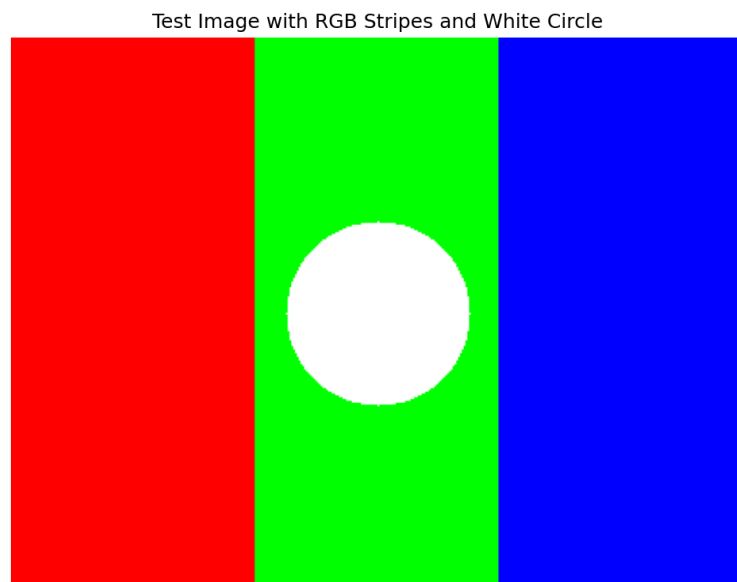- Terminal/command prompt yang menunjukkan environment aktif

Environment aktif di terminal ditandai dengan (Tugas1)

- Output dari script test audio (sine wave plot)

Output plot dari script test audio (sine wave)

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

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

Gunakan perintah \includegraphics untuk menyisipkan gambar

Worksheet 1: Setup Python Environment untuk Multimedia

4.3 Analisis dan Refleksi

Jawab pertanyaan berikut:

1. **Mengapa penting menggunakan environment terpisah untuk project multimedia?**

   Menurut saya karena setiap proyek multimedia memerlukan versi library yang berbeda. Dengan menggunakan environment terpisah, kita dapat menghindari konflik dependency dan memastikan bahwa proyek berjalan dengan versi library yang sesuai tanpa mengganggu proyek lain.

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

   Perbedaan utama nya adalah conda adalah package manager yang juga bisa mengelola environment dan mendukung berbagai bahasa pemrograman, sedangkan venv dan uv adalah tools bawaan Python untuk membuat virtual environment. Saya memilih uv karena lebih ringan dan cepat dibandingkan conda, serta mudah digunakan untuk proyek Python sederhana seperti ini.

3. **Library mana yang paling sulit diinstall dan mengapa?**

   Untuk proyek saya ini belum ada library yang sulit diinstall. Semua library bisa diinstall dengan lancar menggunakan uv dan pip.

4. **Bagaimana cara mengatasi masalah dependency conflict jika terjadi?**

   Dengan cara membuat environment terpisah atau bisa juga dengan membuat environment baru dan menginstall ulang library yang diperlukan. Bisa juga dengan menggunakan versi spesifik dari library yang kompatibel satu sama lain.

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

   Fungsi dari library yang berhasil diinstall adalah sebagai berikut:

   - *numpy: untuk komputasi numerik dan manipulasi array*
   - *pandas: untuk manipulasi dan analisis data*
   - *scipy: untuk komputasi ilmiah dan teknik*
   - *librosa: untuk analisis dan pemrosesan audio*
   - *soundfile: untuk membaca dan menulis file audio*
   - *opencv-python: untuk pemrosesan gambar dan video*
   - *pillow: untuk manipulasi gambar*
   - *scikit-image: untuk pemrosesan gambar*
   - *matplotlib: untuk visualisasi data*
   - *moviepy: untuk pengolahan video*
   - *scikit-learn: untuk machine learning*
   - *jupyter: untuk membuat dan berbagi dokumen yang berisi kode, visualisasi, dan teks naratif*

4.4 Troubleshooting

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

- **Masalah 1:** *Ketika ingin menyisipkan gambar menggunakan begin figure dan end figure di dalam itemize, gambar bisa loncat ke halaman lain karena figure adalah float*

  Solusi: *Caranya bisa dengan pisahkan dulu list dan figurenya dan jangan letakkan langsung di dalam itemize. Bisa juga dengan menambahkan package float dan menggunakan [H] pada begin figure agar gambarnya tidak loncat ke halaman lain*

Worksheet 1: Setup Python Environment untuk Multimedia

- **Masalah 2:**

  Solusi: *[Cara mengatasi]*

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  [aiobotocore==2.20.0
2  aiohappyeyeballs==2.4.6
3  aiohttp==3.11.13
4  aioitertools==0.12.0
5  aiosignal==1.3.2
6  altgraph==0.17.4
7  anyio==4.9.0
8  argon2-cffi==23.1.0
9  argon2-cffi-bindings==21.2.0
10 arrow==1.3.0
11 asttokens==3.0.0
12 async-lru==2.0.5
13 async-timeout==5.0.1
14 attrs==25.1.0
15 audioread==3.0.1
16 babel==2.17.0
17 beautifulsoup4==4.13.4
18 bleach==6.2.0
19 boto3==1.37.1
20 botocore==1.37.2
21 certifi==2025.4.26
22 cffi==1.17.1
23 charset-normalizer==3.4.1
24 colorama==0.4.6
25 comm==0.2.2
26 contourpy==1.3.1
27 cramjam==2.9.1
28 customtkinter==5.2.2
29 cycler==0.12.1
30 darkdetect==0.8.0
31 debugpy==1.8.12
32 decorator==5.2.1
33 defusedxml==0.7.1
34 entrypoints==0.4
35 exceptiongroup==1.2.2
36 executing==2.2.0
37 fastjsonschema==2.21.1
38 fastparquet==2024.11.0
```

Worksheet 1: Setup Python Environment untuk Multimedia

```
39  fonttools==4.56.0
40  fqdn==1.5.1
41  frozenlist==1.5.0
42  fsspec==2025.2.0
43  greenlet==3.2.2
44  h11==0.16.0
45  httpcore==1.0.9
46  httpx==0.28.1
47  hupper==1.12.1
48  idna==3.10
49  imageio==2.37.0
50  imageio-ffmpeg==0.6.0
51  ipykernel==6.29.5
52  ipython==8.32.0
53  ipywidgets==8.1.7
54  isoduration==20.11.0
55  jedi==0.19.2
56  Jinja2==3.1.6
57  jmespath==1.0.1
58  joblib==1.5.2
59  json5==0.12.0
60  jsonpointer==3.0.0
61  jsonschema==4.24.0
62  jsonschema-specifications==2025.4.1
63  jupyter==1.1.1
64  jupyter-console==6.6.3
65  jupyter-events==0.12.0
66  jupyter-lsp==2.2.5
67  jupyter_client==7.4.9
68  jupyter_core==5.7.2
69  jupyter_server==2.16.0
70  jupyter_server_terminals==0.5.3
71  jupyterlab==4.4.3
72  jupyterlab_pygments==0.3.0
73  jupyterlab_server==2.27.3
74  jupyterlab_widgets==3.0.15
75  kiwisolver==1.4.8
76  lazy_loader==0.4
77  librosa==0.11.0
78  llvmlite==0.44.0
79  MarkupSafe==3.0.2
80  matplotlib==3.10.0
81  matplotlib-inline==0.1.7
82  mistune==3.1.3
83  moviepy==2.2.1
84  msgpack==1.1.1
85  multidict==6.1.0
86  nbclient==0.10.2
87  nbconvert==7.16.6
88  nbformat==5.10.4
89  nest-asyncio==1.6.0
90  networkx==3.4.2
91  notebook==7.4.3
92  notebook_shim==0.2.4
93  numba==0.61.2
94  numpy==2.2.3
95  opencv-python==4.12.0.88
96  overrides==7.7.0
97  packaging==24.0
98  pandas==2.2.3
99  pandocfilters==1.5.1
100 parso==0.8.4
```

Worksheet 1: Setup Python Environment untuk Multimedia

```
101  PasteDeploy==3.1.0
102  pefile==2023.2.7
103  pillow==11.1.0
104  plaster==1.1.2
105  plaster-pastedeploy==1.0.1
106  platformdirs==4.3.6
107  pooch==1.8.2
108  proglog==0.1.12
109  prometheus_client==0.22.0
110  prompt_toolkit==3.0.50
111  propcache==0.3.0
112  psutil==7.0.0
113  psycopg2-binary==2.9.10
114  pure_eval==0.2.3
115  pyarrow==19.0.1
116  PyAthena==3.12.2
117  pycparser==2.22
118  pycryptodome==3.23.0
119  pygame==2.5.2
120  Pygments==2.19.1
121  pyinstaller==6.7.0
122  pyinstaller-hooks-contrib==2024.6
123  PyJWT==2.10.1
124  pyparsing==3.2.1
125  pyramid==2.0.2
126  pyramid-jwt==1.6.1
127  python-dateutil==2.9.0.post0
128  python-dotenv==1.1.1
129  python-json-logger==3.3.0
130  pytz==2025.1
131  pywin32==308
132  pywin32-ctypes==0.2.2
133  pywinpty==2.0.15
134  PyYAML==6.0.2
135  pyzmq==24.0.1
136  referencing==0.36.2
137  requests==2.32.3
138  rfc3339-validator==0.1.4
139  rfc3986-validator==0.1.1
140  rpds-py==0.25.1
141  s3fs==2025.2.0
142  s3transfer==0.11.2
143  scikit-image==0.25.2
144  scikit-learn==1.7.1
145  scipy==1.15.3
146  seaborn==0.13.2
147  Send2Trash==1.8.3
148  six==1.17.0
149  sniffio==1.3.1
150  soundfile==0.13.1
151  soupsieve==2.7
152  soxr==0.5.0.post1
153  SQLAlchemy==2.0.41
154  stack-data==0.6.3
155  tenacity==9.0.0
156  terminado==0.18.1
157  threadpoolctl==3.6.0
158  tifffile==2025.5.10
159  tinycss2==1.4.0
160  tomli==2.2.1
161  tornado==6.4.2
162  tqdm==4.67.1
```

Worksheet 1: Setup Python Environment untuk Multimedia

```
163  traitlets==5.14.3
164  translationstring==1.4
165  types-python-dateutil==2.9.0.20250516
166  typing_extensions==4.12.2
167  tzdata==2025.1
168  uri-template==1.3.0
169  urllib3==2.3.0
170  uv==0.8.13
171  venusian==3.1.1
172  wcwidth==0.2.13
173  webcolors==24.11.1
174  webencodings==0.5.1
175  WebOb==1.8.9
176  websocket-client==1.8.0
177  widgetsnbextension==4.0.14
178  wrapt==1.17.2
179  yarl==1.18.3
180  zope.deprecation==5.1
181  zope.interface==7.2
182  ]
```

Kode 14: Environment/Requirements file

6 Kesimpulan

Tuliskan kesimpulan Anda mengenai:

- Pengalaman setup Python environment untuk multimedia

- Persiapan untuk project multimedia selanjutnya

- Saran untuk mahasiswa lain yang akan melakukan setup serupa

Kesimpulannya adalah proses setup Python environment untuk multimedia ini berjalan lancar dan saya tidak mengalami banyak kendala. Dengan environment yang sudah terpisah, saya merasa lebih clean dan tidak takut lagi tentang konflik dependency. Saran saya untuk mahasiswa lain adalah selalu gunakan virtual environment untuk setiap proyek agar lebih terorganisir dan mudah dalam manajemen library. Selain itu, dokumentasikan setiap langkah yang diambil agar memudahkan troubleshooting di kemudian hari.

7 Referensi

Sertakan referensi yang Anda gunakan selama proses setup dan troubleshooting.

References

https://chatgpt.com/share/68b1b4e9-ad18-8009-99c6-351b60daaa0d