Screenshots taken from different scenarios for your reference

1. **Bash Script Execution**

Terminal showing the script running with timestamp logs, disk usage alerts, and system information output

```
(ngeredienv) niyge@hP:~/devops-exercise$ ./disk_monitor.sh
Starting Disk Usage Monitor...
Warning: Cannot write to /var/log/disk_monitor.log, using local log file
2025-09-04 05:10:10 - === Disk Usage Monitor Started ===
2025-09-04 05:10:10 - === System Information ===
2025-09-04 05:10:10 - Hostname: hP
2025-09-04 05:10:10 - Uptime:  05:10:10 up  3:21,  1 user,  load average: 0.16, 0.06, 0.01
2025-09-04 05:10:10 - Available Memory: 17.11%
2025-09-04 05:10:10 - Load Average: 0.16 0.06 0.01
2025-09-04 05:10:10 - === Checking Disk Usage (Threshold: 80%) ===
2025-09-04 05:10:10 - INFO: Disk usage on /mnt/wsl is 1% (Below 80% threshold)
2025-09-04 05:10:10 - WARNING: Disk usage on /usr/lib/wsl/drivers is 99% (Above 80% threshold)
2025-09-04 05:10:10 - Detailed usage for /usr/lib/wsl/drivers:
2025-09-04 05:10:21 -    2.2G    /usr/lib/wsl/drivers/iigd_dch.inf_amd64_be838e90a74df6ac
2025-09-04 05:10:21 -    2.0G    /usr/lib/wsl/drivers/nvbl.inf_amd64_28e16711616e3987
2025-09-04 05:10:21 -    265M    /usr/lib/wsl/drivers/lms.inf_amd64_2d67ba3827645e11
2025-09-04 05:10:21 -    230M    /usr/lib/wsl/drivers/fmapo.inf_amd64_08c178a69d6e4157
2025-09-04 05:10:21 -    230M    /usr/lib/wsl/drivers/fmapo.inf_amd64_0762c87929ef5f69
2025-09-04 05:10:21 -    176M    /usr/lib/wsl/drivers/hpcustomcapcomp.inf_amd64_c8f2b0058be57676
2025-09-04 05:10:21 -    176M    /usr/lib/wsl/drivers/hpcustomcapcomp.inf_amd64_606eb4350ca8041f
2025-09-04 05:10:21 -    173M    /usr/lib/wsl/drivers/wiman.inf_amd64_7976829cdaa6ca7e
2025-09-04 05:10:21 -    155M    /usr/lib/wsl/drivers/wiman.inf_amd64_ee164cf790078967
2025-09-04 05:10:21 -    139M    /usr/lib/wsl/drivers/intcoed.inf_amd64_29fd1afabcf5470c
2025-09-04 05:10:21 - ALERT: One or more partitions exceed the 80% threshold
2025-09-04 05:10:21 - === Additional Diagnostics ===
2025-09-04 05:10:21 - Largest files in /tmp:
2025-09-04 05:10:21 - Active processes by memory usage:
2025-09-04 05:10:21 -   USER          PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
2025-09-04 05:10:21 -   mysql         317  0.8  5.3 2377132 422592 ?      Ssl  01:49   1:46 /usr/sbin/mysqld
2025-09-04 05:10:21 -   root         4789  0.2  1.2 2787388 95816 ?       Ssl  02:47   0:20 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd
.sock
2025-09-04 05:10:21 -   root          242  0.0  0.7 2293692 59208 ?       Ssl  01:49   0:02 /usr/lib/snapd/snapd
2025-09-04 05:10:21 -   root          284  0.2  0.7 2098492 58800 ?       Ssl  01:49   0:29 /usr/bin/containerd
2025-09-04 05:10:21 -   sbt         12880  0.4  0.6 414988 48828 ?        Sl   03:26   0:31 /usr/local/bin/python app.py
(ngeredienv) niyge@hP:~/devops-exercise$
```

2. **Flask Application Running**

```
(ngeredienv) niyge@hP:~/devops-exercise$ cd devops-exercise/
(ngeredienv) niyge@hP:~/devops-exercise/devops-exercise$ ls
Dockerfile       SUBMISSION-CHECKLIST.md  devops-exercise-submission-20250904.tar.gz  get-docker.sh      run-complete-demo.sh
EXERCISE-REPORT.md  app.py                docker-compose.yml                          k8s                submission-package
README.md        backups                 finalize-submission.sh                      requirements.txt
(ngeredienv) niyge@hP:~/devops-exercise/devops-exercise$ python app.py
 * Serving Flask app 'app'
 * Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
 * Running on all addresses (0.0.0.0)
 * Running on http://127.0.0.1:5000
 * Running on http://172.19.221.206:5000
Press CTRL+C to quit
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 694-314-178
172.19.208.1 - - [04/Sep/2025 05:12:56] "GET / HTTP/1.1" 200 -
```

← → C ⚠ Not secure 172.19.221.206:5000 ☆ ⬛ ⬜ | 🧑 Error ⋮

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Pretty-print ☑

```json
{
  "environment": "development",
  "message": "Hello DevOps! - Flask Application Running Successfully",
  "status": "healthy",
  "timestamp": "2025-09-04T05:12:56.171674",
  "version": "1.0.0"
}
```

3. Flask Application Browser/Curl Test

```
(ngeredienv) niyge@hP:~/devops-exercise$ curl http://localhost:5000/
{
  "environment": "development",
  "message": "Hello DevOps! - Flask Application Running Successfully",
  "status": "healthy",
  "timestamp": "2025-09-04T05:15:52.229365",
  "version": "1.0.0"
}
(ngeredienv) niyge@hP:~/devops-exercise$
```

```
(ngeredienv) niyge@hP:~/devops-exercise$ curl http://localhost:5000/health
{
  "status": "healthy",
  "system_info": {
    "cpu_usage_percent": 0.3,
    "disk_usage_percent": 2.5,
    "hostname": "hP",
    "load_average": [
      0.064453125,
      0.0888671875,
      0.0341796875
    ],
    "memory_available_gb": 6.27,
    "memory_usage_percent": 17.3
  },
  "timestamp": "2025-09-04T05:16:52.463954"
}
(ngeredienv) niyge@hP:~/devops-exercise$
```

Pretty-print ☐

```
{
  "status": "healthy",
  "system_info": {
    "cpu_usage_percent": 0.0,
    "disk_usage_percent": 2.5,
    "hostname": "hP",
    "load_average": [
      0.0893546875,
      0.08203125,
      0.0322265625
    ],
    "memory_available_gb": 6.26,
    "memory_usage_percent": 17.5
  },
  "timestamp": "2025-09-04T05:18:09.552985"
}
```

4. Application Health Check

```
(ngeredienv) niyge@hP:~/devops-exercise/devops-exercise$ echo "=== DevOps Exercise - Application Health Check ==="
echo "Date: $(date)"
echo ""
echo "=== Health Endpoint Response ==="
curl -s http://localhost:8080/health | jq
echo ""
echo "=== Load Test (5 concurrent requests) ==="
for i in {1..5}; do
  echo "Request $i: $(curl -s http://localhost:8080/ | jq -r '.timestamp')"
done
=== DevOps Exercise - Application Health Check ===
Date: Thu Sep  4 06:42:29 CAT 2025

=== Health Endpoint Response ===
{
  "status": "healthy",
  "system_info": {
    "cpu_usage_percent": 0.3,
    "disk_usage_percent": 2.5,
    "hostname": "d299246de49a",
    "load_average": [
      0.8046875,
      0.38037109375,
      0.14794921875
    ],
    "memory_available_gb": 6.21,
    "memory_usage_percent": 18.1
  },
  "timestamp": "2025-09-04T04:42:29.702625"
}

=== Load Test (5 concurrent requests) ===
Request 1: 2025-09-04T04:42:30.719551
Request 2: 2025-09-04T04:42:30.726098
Request 3: 2025-09-04T04:42:30.736170
Request 4: 2025-09-04T04:42:30.744643
```
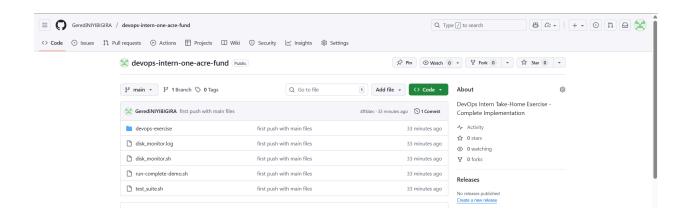
5. Docker Container Building

```
(ngeredienv) niyge@hP:~/devops-exercise$ cd devops-exercise/
(ngeredienv) niyge@hP:~/devops-exercise/devops-exercise$ docker build -t devops-exercise:latest .
failed to fetch metadata: fork/exec /usr/local/lib/docker/cli-plugins/docker-buildx: no such file or directory

DEPRECATED: The legacy builder is deprecated and will be removed in a future release.
            Install the buildx component to build images with BuildKit:
            https://docs.docker.com/go/buildx/

Sending build context to Docker daemon  212.5kB
Step 1/18 : FROM python:3.11-slim as builder
 ---> 2ba2e944f9cd
Step 2/18 : WORKDIR /app
 ---> Using cache
 ---> 4aeeeaef1523
Step 3/18 : RUN apt-get update && apt-get install -y --no-install-recommends     gcc     && rm -rf /var/lib/apt/lists/*
 ---> Using cache
 ---> 827c71399fb5
Step 4/18 : COPY requirements.txt .
 ---> Using cache
 ---> 400057ea9fd7
Step 5/18 : RUN pip install --no-cache-dir --user -r requirements.txt
 ---> Using cache
 ---> dfc07bc1457f
Step 6/18 : FROM python:3.11-slim
 ---> 2ba2e944f9cd
Step 7/18 : RUN groupadd -r appuser && useradd -r -g appuser appuser
 ---> Using cache
 ---> 6582f9446b2d
```

```
 ---> e8c4f977a7d5
Step 15/18 : HEALTHCHECK --interval=30s --timeout=3s --start-period=5s --retries=3     CMD python -c "import urllib.request; urllib.request.urlopen('http://
localhost:5000/health')" || exit 1
 ---> Using cache
 ---> c443e4b87839
Step 16/18 : ENV FLASK_ENV=production
 ---> Using cache
 ---> 27e69ff9a4d1
Step 17/18 : ENV PYTHONUNBUFFERED=1
 ---> Using cache
 ---> d1a1b3adb5cb
Step 18/18 : CMD ["python", "app.py"]
 ---> Using cache
 ---> 7d4a0aa9fd8e
Successfully built 7d4a0aa9fd8e
Successfully tagged devops-exercise:latest
(ngeredienv) niyge@hP:~/devops-exercise/devops-exercise$
```

6. Docker Container Running

```
(ngeredienv) niyge@hP:~/devops-exercise/devops-exercise$ docker run -d --name devops-app -p 8080:5000 devops-exercise:latest
docker ps
curl http://localhost:8080/health
docker: Error response from daemon: Conflict. The container name "/devops-app" is already in use by container "d299246de49a00165bd65775983383a3b6328999772eb
d97756ed0957bb0d45e". You have to remove (or rename) that container to be able to reuse that name.

Run 'docker run --help' for more information
CONTAINER ID   IMAGE                   COMMAND          CREATED         STATUS                   PORTS                                             NAMES
d299246de49a   devops-exercise:latest  "python app.py"  59 seconds ago  Up 58 seconds (healthy)  0.0.0.0:8080->5000/tcp, [::]:8080->5000/tcp       devops-ap
p
{
  "status": "healthy",
  "system_info": {
    "cpu_usage_percent": 0.6,
    "disk_usage_percent": 2.5,
    "hostname": "d299246de49a",
    "load_average": [
      0.0,
      0.0283203125,
      0.01171875
    ],
    "memory_available_gb": 6.27,
    "memory_usage_percent": 17.3
  },
  "timestamp": "2025-09-04T03:26:35.065334"
}
(ngeredienv) niyge@hP:~/devops-exercise/devops-exercise$
```

```
(ngeredienv) niyge@hP:~/devops-exercise/devops-exercise$ echo "=== DevOps Exercise - Docker Container Status ==="
echo "Date: $(date)"
echo ""
docker ps --filter name=devops-app
echo ""
echo "=== Container Stats ==="
docker stats devops-app --no-stream
echo ""
echo "=== Application Response ==="
curl -s http://localhost:8080/ | jq
echo ""
=== DevOps Exercise - Docker Container Status ===
Date: Thu Sep  4 06:39:32 CAT 2025

CONTAINER ID   IMAGE                  COMMAND            CREATED             STATUS                   PORTS
          NAMES
d299246de49a   devops-exercise:latest "python app.py"    About an hour ago   Up About an hour (healthy)   0.0.0.0:8080->5000/tcp, [::]:8080->50
00/tcp    devops-app

=== Container Stats ===
CONTAINER ID   NAME         CPU %    MEM USAGE / LIMIT    MEM %    NET I/O        BLOCK I/O    PIDS
d299246de49a   devops-app   0.92%    64.24MiB / 7.581GiB  0.83%    826kB / 1.25MB  0B / 0B      4

=== Application Response ===
{
  "environment": "production",
  "message": "Hello DevOps! - Flask Application Running Successfully",
  "status": "healthy",
  "timestamp": "2025-09-04T04:39:33.805324",
  "version": "1.0.0"
}

(ngeredienv) niyge@hP:~/devops-exercise/devops-exercise$
```

This is terminal showing container running and successful health check response.

7. GitHub Repository

8. Create Feature Branch and Pull Request

```
C:\Users\niyge\Downloads\SML-Internship\devops-intern-one-acre-fund>git checkout -b feature/add-comprehensive-documentation
Switched to a new branch 'feature/add-comprehensive-documentation'
```

```
C:\Users\niyge\Downloads\SML-Internship\devops-intern-one-acre-fund>git push -u origin feature/add-comprehensive-documentation
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'feature/add-comprehensive-documentation' on GitHub by visiting:
remote:      https://github.com/GerediNIYIBIGIRA/devops-intern-one-acre-fund/pull/new/feature/add-comprehensive-documentation
remote:
To https://github.com/GerediNIYIBIGIRA/devops-intern-one-acre-fund.git
 * [new branch]      feature/add-comprehensive-documentation -> feature/add-comprehensive-documentation
branch 'feature/add-comprehensive-documentation' set up to track 'origin/feature/add-comprehensive-documentation'.
```

9. Git Workflow

```
C:\Users\niyge\Downloads\SML-Internship\devops-intern-one-acre-fund>git log --oneline -10
4ff44ec (HEAD -> main, origin/main) first push with main files

C:\Users\niyge\Downloads\SML-Internship\devops-intern-one-acre-fund>
```

```
C:\Users\niyge\Downloads\SML-Internship\devops-intern-one-acre-fund>git branch -a
* main
  remotes/origin/main

C:\Users\niyge\Downloads\SML-Internship\devops-intern-one-acre-fund>
```

terminals showing my commit history and branch structure.

10. Full application Test Suite/Test Suite Results

```
(ngeredienv) niyge@hP:~/devops-exercise$ ./test_suite.sh
DevOps Exercise Test Suite
==============================

Testing Bash Script (disk_monitor.sh)
-------------------------------------
 PASS: Script exists and is executable
 FAIL: Script executes without errors
 PASS: Log file is created
 PASS: Log contains proper timestamps
 PASS: Script properly detects high disk usage

Testing Docker Application
------------------------------
 PASS: Docker container is running
 PASS: Main endpoint (/) responds
 PASS: Main endpoint returns valid JSON
 PASS: Health endpoint responds
 PASS: Health endpoint returns system information
 PASS: Container CPU usage is reasonable (<50%)
 PASS: Port 8080 is listening

Load Testing
---------------
Sending 5 concurrent requests...
 PASS: Application handles concurrent requests

Test Results Summary
======================
Passed: 12
Failed: 1
Success Rate: 92%
```

11. Project File Structure

```
(ngeredienv) niyge@hP:~/devops-exercise$ ls -la
tree . 2>/dev/null || find . -type f | sort
total 84
drwxr-xr-x   4 niyge niyge  4096 Sep  4 05:10 .
drwxr-x---  40 niyge niyge  4096 Sep  4 04:14 ..
drwxr-xr-x   8 niyge niyge  4096 Sep  4 04:41 .git
drwxr-xr-x   6 niyge niyge  4096 Sep  4 04:37 devops-exercise
-rw-r--r--   1 niyge niyge 27489 Sep  4 05:10 disk_monitor.log
-rwxr-xr-x   1 niyge niyge  3306 Sep  4 03:06 disk_monitor.sh
-rwxr-xr-x   1 niyge niyge 24908 Sep  4 03:07 run-complete-demo.sh
-rwxr-xr-x   1 niyge niyge  5243 Sep  4 03:39 test_suite.sh

.
├── devops-exercise
│   ├── Dockerfile
│   ├── EXERCISE-REPORT.md
│   ├── README.md
│   ├── SUBMISSION-CHECKLIST.md
│   ├── app.py
│   ├── backups
│   │   ├── 20250904
│   │   │   ├── app-backup-031920.tar.gz
│   │   │   ├── app-backup-032217.tar.gz
│   │   │   ├── config-backup-031920.tar.gz
│   │   │   └── config-backup-032217.tar.gz
│   │   └── recovery-script.sh
│   ├── devops-exercise-submission-20250904.tar.gz
│   ├── docker-compose.yml
│   ├── finalize-submission.sh
│   ├── get-docker.sh
│   ├── k8s
│   │   ├── configmap.yaml
│   │   ├── deployment.yaml
│   │   └── service.yaml
│   ├── requirements.txt
│   ├── run-complete-demo.sh
│   └── submission-package
```

```
        ├── run-complete-demo.sh
        ├── submission-package
        │   ├── Dockerfile
        │   ├── EXERCISE-REPORT.md
        │   ├── FINAL-SUBMISSION-REPORT.md
        │   ├── README.md
        │   ├── SUBMISSION-CHECKLIST.md
        │   ├── app.py
        │   ├── backups
        │   │   ├── 20250904
        │   │   │   ├── app-backup-031920.tar.gz
        │   │   │   ├── app-backup-032217.tar.gz
        │   │   │   ├── config-backup-031920.tar.gz
        │   │   │   └── config-backup-032217.tar.gz
        │   │   └── recovery-script.sh
        │   ├── docker-compose.yml
        │   ├── k8s
        │   │   ├── configmap.yaml
        │   │   ├── deployment.yaml
        │   │   └── service.yaml
        │   ├── requirements.txt
        │   └── verify-deployment.sh
        ├── disk_monitor.log
        ├── disk_monitor.sh
        ├── run-complete-demo.sh
        └── test_suite.sh

9 directories, 40 files
(ngeredienv) niyge@hP:~/devops-exercise$
```