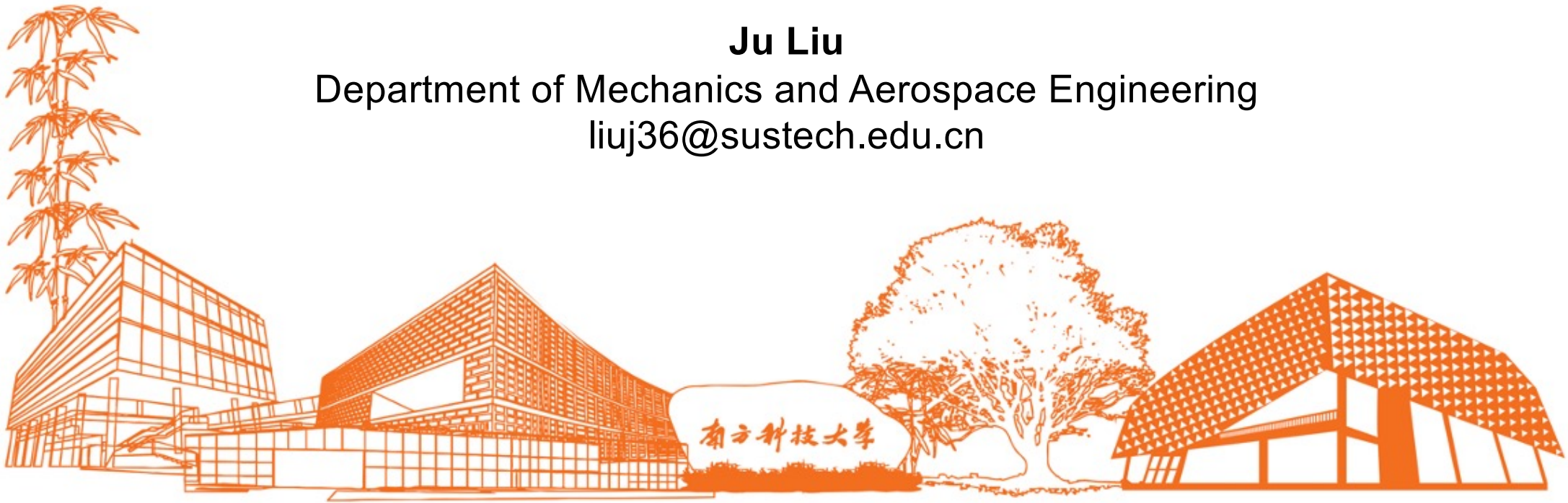


MAE 5032 High Performance Computing: Methods and Applications

Lab 1: Unix/Linux

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Objective

- You will review
 - Text editor in Linux
 - Shell scripting
 - File mode
 - Environmental variable
- You will get
 - an automatic file backup script

Task 1: Setting up the files

- Open a terminal
- Navigate to home directory: ``cd ~``
- Create a directory: ``mkdir mae5032_lab && cd mae5032_lab``
- Create files using echo and pipe:
 - ``echo "This is file 1" > file1.txt``

Task 1: Setting up the files

- Create files using vi:
 - ``vi file1.txt``
 - press ``i`` to enter insert mode
 - type content,
 - press `esc` to enter command mode
 - save by ``:wq``
- Verify with ``cat file1.txt`` and ``cat file2.txt``

Task 2: Write a first backup script

- Create the following script using vi:

```
#!/bin/bash

SOURCE_DIR="$HOME/mae5032_lab"
BACKUP_DIR="$HOME/mae5032_backup"

mkdir -p "$BACKUP_DIR"

BACKUP_FILE="$BACKUP_DIR/backup_$(date +%Y%m%d_%H%M%S).tar.gz"

echo "Creating backup for: $SOURCE_DIR"
tar -czf "$BACKUP_FILE" -C "$SOURCE_DIR" .

echo "Backup saved as: $BACKUP_FILE"

echo "Backup process completed!"

# EOF
```

Use man or deepseek to figureout:

mkdir -p

%Y, etc.

Task 3: Run the script

- **Make executable:** ``chmod u+x backup.sh``
- **Run:** ``./backup.sh``
- **Check backups:** ``ls -lh ~/mae5032_backup``

Task 4: Add the script location to PATH

- Figure out the absolute path to backup.sh
- Run: ``export PATH={your backup.sh location}:$PATH``
- Enter into an arbitrary directory: ``cd /usr``
- Run: ``backup.sh``
- Verify: ``ls -lh ~/mae5032_backup``

Task 5: Enhancement of the script

- Modify the script in the following manner

```
#!/bin/bash

if [ -n "$1" ]; then
    SOURCE_DIR="$1"
else
    SOURCE_DIR="$HOME/mae5032_lab"
fi

BACKUP_DIR="$HOME/mae5032_backup"

if [ ! -d "$SOURCE_DIR" ]; then
    echo "Error: Source directory '$SOURCE_DIR' does not exist!"
    exit 1
fi

mkdir -p "$BACKUP_DIR"

BACKUP_FILE="$BACKUP_DIR/backup_$(date +%Y%m%d_%H%M%S).tar.gz"

echo "Creating backup for: $SOURCE_DIR"
tar -czf "$BACKUP_FILE" -C "$SOURCE_DIR" .

echo "Backup saved as: $BACKUP_FILE"

echo "Backup process completed!"

#EOF
```


Task 5: Enhancement of the script

- Go to

<https://github.com/ju-liu/MAE-5032-2025S/blob/main/week-02/backup.sh>

Read the script and explain its functionality.

Summary

- Practiced vi commands
- Created an automated backup system
- Implemented backup script
- Learned Linux scripting best practices