Work-flow Diagram:

Output:

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS

root@ce9670552dfc35f1:~/code# ls
ec2.sh  vpc.sh
root@ce9670552dfc35f1:~/code# ./ec2.sh
Checking prerequisites...
Checking for existing EC2 instance...
Creating new EC2 instance...
EC2 Instance created successfully!
EC2 Name: MyEC2-Instance
Instance ID: i-06c46df75898911c8
Region: ap-southeast-1
Details stored in ec2_inventory.json
root@ce9670552dfc35f1:~/code# ls
ec2.sh  ec2_inventory.json  vpc.sh
root@ce9670552dfc35f1:~/code# ./ec2.sh
Checking prerequisites...
Checking for existing EC2 instance...
Warning: EC2 instance with name 'MyEC2-Instance' already exists!
{
    "instance_id": "i-06c46df75898911c8",
    "ec2_name": "MyEC2-Instance",
    "region": "ap-southeast-1",
    "created_at": "2025-02-04 06:37:24"
}
Skipping EC2 creation due to conflict.
Please check ec2_inventory.json for existing EC2 details.
root@ce9670552dfc35f1:~/code#
```
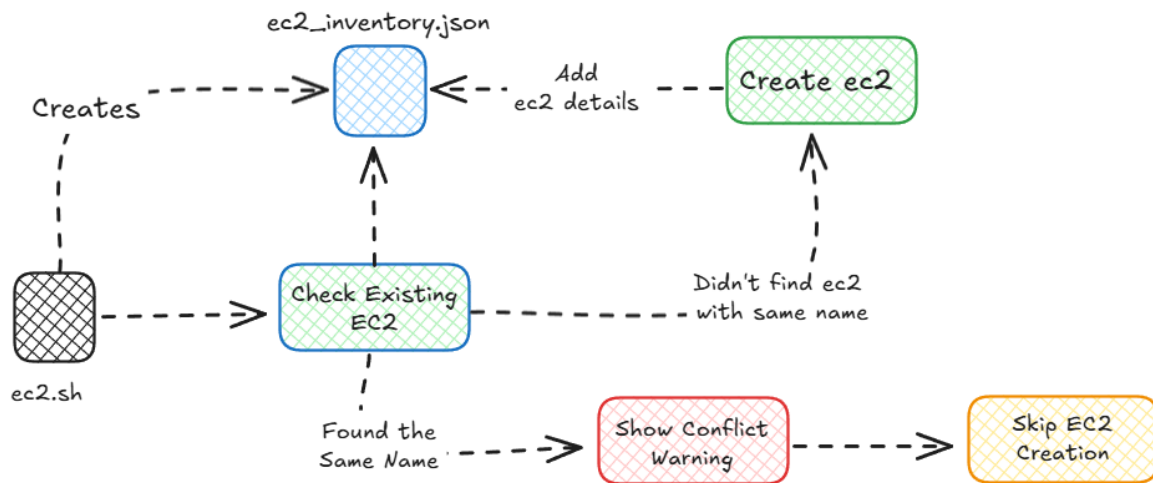
JSON file:

```
    "ec2_name": "MyEC2-Instance",
    "region": "ap-southeast-1",
    "created_at": "2025-02-04 06:37:24"
}
Skipping EC2 creation due to conflict.
Please check ec2_inventory.json for existing EC2 details.
root@ce9670552dfc35f1:~/code# cat ec2_inventory.json
[
  {
    "instance_id": "i-06c46df75898911c8",
    "ec2_name": "MyEC2-Instance",
    "region": "ap-southeast-1",
    "created_at": "2025-02-04 06:37:24"
  }
]
root@ce9670552dfc35f1:~/code#
```

Prerequisites:

- Install jq for json querying, formatting and manipulating json data
- Configure AWS on the machine with keys

Bash_Script:

```bash
#!/bin/bash

# Configuration
REGION="ap-southeast-1"
EC2_NAME="MyEC2-Instance"
AMI_ID="ami-08908d9e195550170"  # Change this to a valid AMI ID
INSTANCE_TYPE="t2.micro"
KEY_NAME="MyKeyPair"
SECURITY_GROUP_ID="sg-00d620a2566cc3364"
JSON_FILE="ec2_inventory.json"

# Function to check if jq is installed
check_jq() {
    if ! command -v jq &> /dev/null; then
        echo "Error: jq is not installed. Please install jq first."
        exit 1
    fi
}

# Function to initialize JSON file if it doesn't exist
init_json_file() {
    if [ ! -f "$JSON_FILE" ]; then
        echo "[]" > "$JSON_FILE"
    fi
}
```

```bash
# Function to check for existing EC2 instance with the same name
check_existing_ec2() {
    local instance_exists=$(jq -r --arg name "$EC2_NAME" \
        'map(select(.ec2_name == $name)) | length' "$JSON_FILE")

    if [ "$instance_exists" -gt 0 ]; then
        echo "Warning: EC2 instance with name '$EC2_NAME' already exists!"
        jq -r --arg name "$EC2_NAME" \
            'map(select(.ec2_name == $name)) | .[]' "$JSON_FILE"
        return 1
    fi
    return 0
}


# Function to add EC2 details to JSON file
add_ec2_to_json() {
    local instance_id=$1
    local temp_file="temp_$JSON_FILE"

    jq --arg id "$instance_id" \
        --arg name "$EC2_NAME" \
        --arg region "$REGION" \
        '. += [{
            "instance_id": $id,
            "ec2_name": $name,
            "region": $region,
            "created_at": (now | strftime("%Y-%m-%d %H:%M:%S"))
        }]' "$JSON_FILE" > "$temp_file" && mv "$temp_file" "$JSON_FILE"
}
```

```bash
# Main script
echo "Checking prerequisites..."
check_jq
init_json_file

echo "Checking for existing EC2 instance..."
if check_existing_ec2; then
    echo "Creating new EC2 instance..."

    INSTANCE_ID=$(aws ec2 run-instances \
        --image-id $AMI_ID \
        --count 1 \
        --instance-type $INSTANCE_TYPE \
        --key-name $KEY_NAME \
        --subnet-id subnet-0f2fa38fe46e20c63 \
        --security-group-ids $SECURITY_GROUP_ID \
        --region $REGION \
        --query 'Instances[0].InstanceId' \
        --output text)

    # Add name tag
    aws ec2 create-tags \
        --resources $INSTANCE_ID \
        --tags Key=Name,Value=$EC2_NAME \
        --region $REGION

    # Add to JSON inventory
    add_ec2_to_json $INSTANCE_ID

    echo "EC2 Instance created successfully!"
```

```bash
    echo "EC2 Name: $EC2_NAME"

    echo "Instance ID: $INSTANCE_ID"

    echo "Region: $REGION"

    echo "Details stored in $JSON_FILE"

else

    echo "Skipping EC2 creation due to conflict."

    echo "Please check $JSON_FILE for existing EC2 details."

fi
```