

Assignment 1

Smart Home Automation Problem

Scenario:

You are a software developer working on a **smart home automation system**. The system needs to control multiple devices in the house, including **lights**, a **thermostat**, and a **security system**. Your task is to create a command-line interface (CLI) application using Dart to manage the smart home's functionality. The system will handle user input to toggle devices, adjust temperature, and monitor the system's status.

Requirements:

1. Main Method:

The program should start with a `main()` function that initializes the smart home system and provides the user with options to control devices.

2. Device Status:

- The system should include three main devices:
 - **Lights** (can be on or off)
 - **Thermostat** (adjustable between 15°C and 30°C)
 - **Security System** (can be armed or disarmed)
- Initialize each device with default values (`lightsOff`, 20°C for thermostat, `disarmed` for the security system).

3. User Interaction:

Use a loop to allow the user to continuously interact with the system until they choose to exit. The user can:

- **Turn the lights on/off**
- **Set the thermostat temperature** between 15°C and 30°C
- **Arm/disarm** the security system
- **View system status**
- **Exit the program**

4. Input Validation:

Ensure valid input by rejecting values outside the temperature range and prompting the user for correct values when necessary.

5. Control Flow:

- Use `if/else` statements to handle user choices.
- Use a `switch` statement to handle device commands (lights, thermostat, security system).
- Implement a **FizzBuzz-like exercise**: if the temperature is a multiple of 3, print "Cool Day" along with the temperature when displaying status; if it's a multiple of 5, print "Warm Day"; if it's a multiple of both, print "Perfect Day."

6. String Interpolation and Operations:

- When displaying device status, use **string interpolation** to include the values of the lights, thermostat, and security system in user-friendly messages.
- Implement string operations to convert device status (e.g., "armed" to "ARMED") when showing system status.

7. **Final/Const Variables:**

- Use `const` for any constant values, such as maximum and minimum temperatures.

8. **Logical & Relational Operators:**

- Use these to validate user input when adjusting the thermostat and when turning the security system on/off.
- **Example Output:**

```
Welcome to the Smart Home System!
Please choose an action:
1. Toggle lights
2. Set thermostat temperature
3. Arm/disarm security system
4. View system status
5. Exit

Enter your choice: 1
Lights are now ON.

Enter your choice: 2
Set thermostat temperature (15°C – 30°C): 25
Thermostat set to 25°C.

Enter your choice: 4
System Status:
– Lights: ON
– Thermostat: 25°C – Warm Day
– Security System: DISARMED

Enter your choice: 5
Exiting the system. Goodbye!
```

Solution

```
import 'dart:io';
const String reset = '\x1B[0m';
const String yellow = '\x1B[33m';
const String pink = '\x1B[95m';
const String cyan = '\x1B[96m';
const String bold = '\x1B[1m';

void main() {
  const int minTemp = 15;
  const int maxTemp = 30;

  bool lightsOn = false;
  int thermostat = 20;
  bool securityArmed = false;

  print('${cyan>Welcome to the Smart Home System!$reset');
  while (true) {
    print('\n${pink}Please choose an action:$reset');
    print('${pink}1.${reset} Toggle lights');
    print('${pink}2.${reset} Set thermostat temperature');
    print('${pink}3.${reset} Arm/disarm security system');
    print('${pink}4.${reset} View system status');
    print('${pink}5.${reset} Exit');

    stdout.write('\n${yellow}Enter your choice:$reset ');
    String? choice = stdin.readLineSync();
    if (choice == '1') {
      lightsOn = !lightsOn;
      print('${yellow}Lights are now ${lightsOn ? "ON" : "OFF"}.$reset');
    } else if (choice == '2') {
      stdout.write(
        '${yellow}Set thermostat temperature ($minTemp°C – $maxTemp°C): $reset');
      int? temp = int.tryParse(stdin.readLineSync() ?? "");
      if (temp != null && temp >= minTemp && temp <= maxTemp) {
        thermostat = temp;
        print('${yellow}Thermostat set to ${thermostat}°C.$reset');
      } else {
        print('${pink}Invalid temperature! Please try again.$reset');
      }
    }
  }
}
```

```

else if (choice == '3') {
    securityArmed = !securityArmed;
    print(
        '${yellow}Security system is now ${securityArmed ? "ARMED" :
"DISARMED"}.$reset');
    } else if (choice == '4') {
        String lightsStatus = lightsOn ? 'ON' : 'OFF';
        String securityStatus = securityArmed ? 'ARMED' : 'DISARMED';
        String dayStatus = "";

        if (thermostat % 3 == 0 && thermostat % 5 == 0) {
            dayStatus = 'Perfect Day';
        } else if (thermostat % 3 == 0) {
            dayStatus = 'Cool Day';
        } else if (thermostat % 5 == 0) {
            dayStatus = 'Warm Day';
        }

        print('\n${cyan}System Status:$reset');
        print('- Lights: $lightsStatus');
        print(
            '- Thermostat: ${thermostat}°C ${dayStatus.isEmpty ? "– $dayStatus" : ""});
        print('- Security System: $securityStatus');
    } else if (choice == '5') {
        print('${cyan}Exiting the system. Goodbye!$reset');
        break;
    } else {
        print('${pink}Invalid choice! Try again.$reset');
    }
}
}
}

```

OutPut :

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL
powershell + - [ ] [ ] ... | [ ] x

• PS C:\Users\MTS\OneDrive\Desktop\Task dart> dart run Task1.dart
Welcome to the Smart Home System!

Please choose an action:
1. Toggle lights
2. Set thermostat temperature
3. Arm/disarm security system
4. View system status
5. Exit

Enter your choice: 1
Lights are now ON.

Please choose an action:
1. Toggle lights
2. Set thermostat temperature
3. Arm/disarm security system
4. View system status
5. Exit

Enter your choice: 2
Set thermostat temperature (15°C - 30°C): 25
Thermostat set to 25°C.

Please choose an action:
1. Toggle lights
2. Set thermostat temperature
3. Arm/disarm security system
4. View system status
5. Exit

Enter your choice: 3
Security system is now ARMED.

Please choose an action:
1. Toggle lights
2. Set thermostat temperature
3. Arm/disarm security system
4. View system status
5. Exit
```

Please choose an action:

1. Toggle lights
2. Set thermostat temperature
3. Arm/disarm security system
4. View system status
5. Exit

Enter your choice: 4

System Status:

- Lights: ON
- Thermostat: 25°C - Warm Day
- Security System: ARMED

Please choose an action:

1. Toggle lights
2. Set thermostat temperature
3. Arm/disarm security system
4. View system status
5. Exit

Enter your choice: 5

Exiting the system. Goodbye!