

Smart Home Automation System (Dart)

Below is the complete Dart program that meets all the requirements outlined in the assignment.

```
import 'dart:io';

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

  // ===== Default Device Status =====
  bool lightsOn = false;
  int thermostat = 20;
  bool securityArmed = false;

  // ===== Main Menu Loop =====
  while (true) {
    print('\nWelcome to the Smart Home System!');
    print('Please choose an action:');
    print('1. Toggle lights');
    print('2. Set thermostat temperature');
    print('3. Arm/disarm security system');
    print('4. View system status');
    print('5. Exit');

    stdout.write('\nEnter your choice: ');
    String? choice = stdin.readLineSync();

    if (choice == null) continue;

    switch (choice) {
      case '1':
        // Toggle lights
        lightsOn = !lightsOn;
        print('Lights are now ${lightsOn ? "ON" : "OFF"}');
        break;

      case '2':
        // Set thermostat
        stdout.write('Set thermostat temperature ($minTemp°C - $maxTemp°C): ');
        String? input = stdin.readLineSync();
        if (input == null) break;

        int? newTemp = int.tryParse(input);
        if (newTemp == null) {
          print('Invalid input! Please enter a number');
          break;
        }

        if (newTemp < minTemp || newTemp > maxTemp) {
          print('Temperature must be between $minTemp°C and $maxTemp°C');
        } else {
          thermostat = newTemp;
          print('Thermostat set to ${thermostat}°C');
        }
        break;

      case '3':
        // Arm/disarm security system
        securityArmed = !securityArmed;
        print('Security system is now ${securityArmed ? "ARMED" : "DISARMED"}');
        break;

      case '4':
        // View system status
        String tempStatus = '';
        if (thermostat % 3 == 0 && thermostat % 5 == 0) {
          tempStatus = 'Perfect Day';
        } else if (thermostat % 3 == 0) {
          tempStatus = 'Cool Day';
        } else if (thermostat % 5 == 0) {
          tempStatus = 'Warm Day';
        }
        break;
    }
  }
}
```

```

    }

    print('\nSystem Status:');
    print('- Lights: ${lightsOn ? "ON" : "OFF"}');
    print('- Thermostat: ${thermostat}°C'
        '${tempStatus.isNotEmpty ? " - $tempStatus" : ""}');
    print('- Security System: ${securityArmed ? "ARMED" : "DISARMED"}');
    break;

case '5':
    print('Exiting the system. Goodbye!');
    return;

default:
    print('Invalid choice! Please try again.');
```

Budget Management Application (Dart)

This document contains the complete Dart code for the Budget Management Application. The program allows users to add income and expenses, calculate total profit or loss, and compute a 15% tax on profits using a ternary operator.

```
import 'dart:io';

void main() {
  List<Map<String, double>> incomeList = [];
  List<Map<String, double>> expenseList = [];

  print("Welcome to the Budget Management Application!");

  while (true) {
    print("\nPlease choose an option:");
    print("1. Add income");
    print("2. Add expense");
    print("3. View summary");
    print("4. Exit");

    stdout.write("\nEnter your choice: ");
    String? choice = stdin.readLineSync();

    if (choice == '1') {
      stdout.write("Enter income description: ");
      String? desc = stdin.readLineSync();

      stdout.write("Enter income amount: ");
      double? amount = double.tryParse(stdin.readLineSync() ?? '');

      if (amount == null || amount < 0) {
        print("Invalid amount! Please enter a positive number.");
      } else {
        incomeList.add({desc ?? "Income": amount});
        print("Income added!");
      }
    }

    } else if (choice == '2') {
      stdout.write("Enter expense description: ");
      String? desc = stdin.readLineSync();

      stdout.write("Enter expense amount: ");
      double? amount = double.tryParse(stdin.readLineSync() ?? '');

      if (amount == null || amount < 0) {
        print("Invalid amount! Please enter a positive number.");
      } else {
        expenseList.add({desc ?? "Expense": amount});
        print("Expense added!");
      }
    }

    } else if (choice == '3') {
      double totalIncome = 0;
      double totalExpense = 0;
```

```

    for (var income in incomeList) {
        totalIncome += income.values.first;
    }

    for (var expense in expenseList) {
        totalExpense += expense.values.first;
    }

    double netProfit = totalIncome - totalExpense;
    double tax = netProfit > 0 ? netProfit * 0.15 : 0;

    print("\nSummary:");
    print("Total income: \${totalIncome.toStringAsFixed(2)}");
    print("Total expenses: \${totalExpense.toStringAsFixed(2)}");

    if (netProfit > 0) {
        print("Net profit: \${netProfit.toStringAsFixed(2)}");
        print("Tax to be paid: \${tax.toStringAsFixed(2)}");
    } else if (netProfit < 0) {
        print("Net loss: \${(-netProfit).toStringAsFixed(2)}");
    } else {
        print("No profit or loss this month.");
    }

} else if (choice == '4') {
    print("Exiting the application. Goodbye!");
    break;

} else {
    print("Invalid choice! Please select a valid option (1-4).");
}
}
}

```