```csharp
1  using Microsoft.Win32;
2  using System;
3  using System.Collections.Generic;
4  using System.IO;
5  using System.Text.Encodings.Web;
6  using System.Text.Json;
7  using System.Text.Json.Serialization;
8  using System.Text.Unicode;
9  using System.Windows;
10 using System.Windows.Input;
11 using System.Windows.Media.Media3D;
12
13 namespace WpfApp1
14 {
15     /// <summary>
16     /// Interaction logic for MainWindow.xaml
17     /// </summary>
18     public partial class MainWindow : Window
19     {
20         List<Student> students = new List<Student>();
21         Student selectedStudent = null;
22
23         List<Course> courses = new List<Course>();
24         Course selectedCourse = null;
25         List<Teacher> teachers = new List<Teacher>();
26         Teacher selectedTeacher = null;
27
28         List<Record> records = new List<Record>();
29         Record selectedRecord = null;
30         public MainWindow()
31         {
32             InitializeComponent();
33
34             //InitializeStudent();
35
36             // 修改這裡，提供 JSON 學生資料檔案的路徑
37             InitializeStudentFromJson("C:\\Users\\ryan0\
                 \Downloads\\2023student (1).json");
38
39             InititalizeCourse();
40         }
41
42         private void InititalizeCourse()
43         {
44             Teacher teacher1 = new Teacher() { TeacherName =
                 "陳定宏" };
45             teacher1.TeachingCourses.Add(new Course(teacher1)
```

```csharp
                { CourseName = "視窗程式設計", OpeningClass =
                "五專三甲", Point = 3, Type = "必修" });
46          teacher1.TeachingCourses.Add(new Course(teacher1)
                { CourseName = "視窗程式設計", OpeningClass =
                "四技二甲", Point = 3, Type = "選修" });
47          teacher1.TeachingCourses.Add(new Course(teacher1)
                { CourseName = "視窗程式設計", OpeningClass =
                "四技二乙", Point = 3, Type = "選修" });
48          teacher1.TeachingCourses.Add(new Course(teacher1)
                { CourseName = "視窗程式設計", OpeningClass =
                "四技二丙", Point = 3, Type = "選修" });
49
50          Teacher teacher2 = new Teacher() { TeacherName =
                "陳福坤" };
51          teacher2.TeachingCourses.Add(new Course(teacher2)
                { CourseName = "計算機概論", OpeningClass = "四
                技一丙", Point = 2, Type = "必修" });
52          teacher2.TeachingCourses.Add(new Course(teacher2)
                { CourseName = "計算機概論", OpeningClass = "四
                技一甲一乙", Point = 2, Type = "必修" });
53          teacher2.TeachingCourses.Add(new Course(teacher2)
                { CourseName = "數位系統導論", OpeningClass =
                "四技一乙", Point = 3, Type = "必修" });
54
55          Teacher teacher3 = new Teacher() { TeacherName =
                "許子衡" };
56          teacher3.TeachingCourses.Add(new Course(teacher3)
                { CourseName = "Android程式設計", OpeningClass
                = "四技資工三甲等合開", Point = 3, Type = "選
                修" });
57          teacher3.TeachingCourses.Add(new Course(teacher3)
                { CourseName = "人工智慧與雲端運算", OpeningClass
                = "四技資工四甲等合開", Point = 3, Type = "選
                修" });
58          teacher3.TeachingCourses.Add(new Course(teacher3)
                { CourseName = "動態程式語言", OpeningClass =
                "五專資工三甲", Point = 3, Type = "系定選修" });
59
60          teachers.Add(teacher1);
61          teachers.Add(teacher2);
62          teachers.Add(teacher3);
63
64          tvTeacher.ItemsSource = teachers;
65
66          foreach (Teacher teacher in teachers)
67          {
68              foreach (Course course in
```

```csharp
                teacher.TeachingCourses)
69                   {
70                       courses.Add(course);
71                   }
72               }
73               lbCourse.ItemsSource = courses;
74           }
75
76           private void InitializeStudent()
77           {
78               students.Add(new Student { StudentId = "A10001",
                   StudentName = "陳小明" });
79               students.Add(new Student { StudentId = "A10002",
                   StudentName = "王小美" });
80               students.Add(new Student { StudentId = "A10003",
                   StudentName = "林小英" });
81               students.Add(new Student { StudentId = "A10004",
                   StudentName = "黃大山" });
82
83
84               cmbStudent.ItemsSource = students;
85               cmbStudent.SelectedIndex = 0;
86           }
87
88           private void cmbStudent_SelectionChanged(object
             sender,
             System.Windows.Controls.SelectionChangedEventArgs
             e)
89           {
90               selectedStudent = (Student)
                   cmbStudent.SelectedItem;
91               labelStatus.Content = $"選取學生：
                   {selectedStudent.ToString()}";
92           }
93
94           private void tvTeacher_SelectedItemChanged(object
               sender, RoutedPropertyChangedEventArgs<object> e)
95           {
96               if (tvTeacher.SelectedItem is Teacher)
97               {
98                   selectedTeacher = (Teacher)
                     tvTeacher.SelectedItem;
99                   labelStatus.Content = $"選取教師：
                     {selectedTeacher.ToString()}";
100              }
101              else if (tvTeacher.SelectedItem is Course)
102              {
```

```
103                 selectedCourse = (Course)
                    tvTeacher.SelectedItem;
104                 labelStatus.Content = selectedCourse.ToString
                    ();
105             }
106         }
107
108         private void btnRegister_Click(object sender,
               RoutedEventArgs e)
109         {
110             if (selectedStudent == null || selectedCourse ==
                  null)
111             {
112                 MessageBox.Show("請選取學生或課程");
113                 return;
114             }
115             else
116             {
117                 Record newRecord = new Record()
                    { SelectedStudent = selectedStudent,
                    SelectedCourse = selectedCourse };
118
119                 foreach (Record r in records)
120                 {
121                     if (r.Equals(newRecord))
122                     {
123                         MessageBox.Show
                    ($"{selectedStudent.StudentName}已選取
                    {selectedCourse.CourseName}");
124                         return;
125                     }
126                 }
127
128                 records.Add(newRecord);
129                 lvRecord.ItemsSource = records;
130                 lvRecord.Items.Refresh();
131             }
132         }
133
134         private void lbCourse_SelectionChanged(object sender,
               System.Windows.Controls.SelectionChangedEventArgs
               e)
135         {
136             selectedCourse = (Course)lbCourse.SelectedItem;
137             labelStatus.Content = selectedCourse.ToString();
138         }
139
```

```csharp
140          private void lvRecord_SelectionChanged(object sender, ⮐
                System.Windows.Controls.SelectionChangedEventArgs ⮐
             e)
141          {
142              selectedRecord = (Record)lvRecord.SelectedItem;
143              if (selectedRecord != null) labelStatus.Content = ⮐
                    selectedRecord.ToString();
144          }
145
146          private void btnWithdrawl_Click(object sender,         ⮐
                RoutedEventArgs e)
147          {
148              if (selectedRecord != null)
149              {
150                  records.Remove(selectedRecord);
151                  lvRecord.ItemsSource = records;
152                  lvRecord.Items.Refresh();
153              }
154          }
155
156          private void InitializeStudentFromJson(string          ⮐
             filePath)
157          {
158              try
159              {
160                  string jsonString = File.ReadAllText            ⮐
                    (filePath);
161                  students =                                      ⮐
                    JsonSerializer.Deserialize<List<Student>>        ⮐
                    (jsonString);
162
163                  cmbStudent.ItemsSource = students;
164                  cmbStudent.SelectedIndex = 0;
165              }
166              catch (Exception ex)
167              {
168                  MessageBox.Show($"無法載入學生資料:             ⮐
                    {ex.Message}");
169              }
170          }
171
172
173          private void btnSave_Click(object sender,               ⮐
                RoutedEventArgs e)
174          {
175              SaveFileDialog saveFileDialog = new                 ⮐
                    SaveFileDialog();
```

```
176            saveFileDialog.Filter = "Json文件 (*.json)|*.json|
                 All Files (*.*)|*.*";
177            saveFileDialog.Title = "儲存學生選課紀錄";
178
179            if (saveFileDialog.ShowDialog() == true)
180            {
181                JsonSerializerOptions options = new
                   JsonSerializerOptions
182                {
183                    Encoder = JavaScriptEncoder.Create
                     (UnicodeRanges.All),
184                    ReferenceHandler =
                     ReferenceHandler.Preserve,
185                    WriteIndented = true
186                };
187
188                string jsonString = JsonSerializer.Serialize
                   (records, options);
189                File.WriteAllText(saveFileDialog.FileName,
                   jsonString);
190            }
191        }
192    }
193 }
```