

[1]

```
11 namespace Week4_1
12 {
13     public partial class Form1 : Form
14     {
15         public Form1()
16         {
17             InitializeComponent();
18         }
19
20         int scores_index = 0; //인스턴스변수
21         double[] scores = new double[5]; //배열, 고정길이, 인스턴스변수
22
23         private void btnInput_Click(object sender, EventArgs e)
24         {
25             if (scores_index >= scores.Length)
26             {
27                 lblResult.Text = "더 이상 입력 불가능 합니다.";
28                 return;
29             }
30
31             if (false == double.TryParse(tbxScore.Text, out double score))
32             {
33                 lblResult.Text = "올바른 형식의 숫자를 넣어주세요.";
34                 return;
35             }
36
37             if (score < 0.0 || score > 100.0)
38             {
39                 lblResult.Text = "0~100 사이의 점수를 넣어주세요.";
40                 return;
41             }
42
43             scores[scores_index] = score;
44             scores_index++;
45
46             lblResult.Text = $"[{scores_index}] {score} 점을 입력하였습니다.";
47         }
48     }
```

```

48
49 private void btnView_Click(object sender, EventArgs e)
50 {
51     if (scores_index == 0)
52     {
53         lblResult.Text = "조회할 내용이 없습니다.";
54         return;
55     }
56
57     //평균, 최대값, 최소값
58     double sum = 0;
59     double avg = 0;
60     double max = 0;
61     double min = 100.0;
62
63     string scores_list = string.Empty;
64     for (int i = 0; i < scores_index; i++)
65     {
66         sum += scores[i];
67
68         if (max < scores[i]) { max = scores[i]; }
69         if (min > scores[i]) { min = scores[i]; }
70
71         scores_list += (scores_list.Length > 0) ? $", {scores[i]:F2}" : $"{scores[i]:F2}";
72     }
73     avg = sum / scores_index;
74
75     string message =
76         $"현재인원 : {scores_index}명 {Environment.NewLine}" +
77         $"전체점수 : {scores_list} {Environment.NewLine}" +
78         $"평균 : {avg:F2} {Environment.NewLine}" +
79         $"최고점 : {max:F2} {Environment.NewLine}" +
80         $"최저점 : {min:F2} {Environment.NewLine}";
81
82     lblResult.Text = message;
83 }
84
85
86

```

[2]

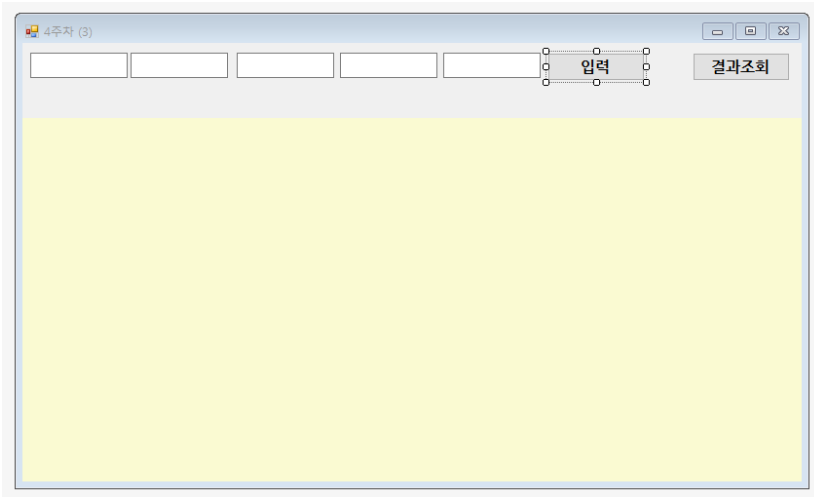
```
11 namespace Week4_2
12 {
13     public partial class Form1 : Form
14     {
15         public Form1()
16         {
17             InitializeComponent();
18         }
19
20         int currIndex = 0;
21         double[,] scores = new double[10, 3]; // 2차원 배열
22
23         private void btnInput_Click(object sender, EventArgs e)
24         {
25             if (currIndex >= scores.GetLength(0)) // 0: 1차원 1: 2차원 Length: 전체 요소의 갯수
26             {
27                 lblResult.Text = "더 이상 입력을 할 수 없습니다.";
28                 return;
29             }
30
31             if (false == double.TryParse(tbxKor.Text, out double scoreKor)
32                 || false == double.TryParse(tbxEng.Text, out double scoreEng)
33                 || false == double.TryParse(tbxMat.Text, out double scoreMat))
34             {
35                 lblResult.Text = "정확한 형식의 값을 넣어주세요.";
36                 return;
37             }
38
39             if (scoreKor < 0.0 || scoreKor > 100.0
40                 || scoreEng < 0.0 || scoreEng > 100.0
41                 || scoreMat < 0.0 || scoreMat > 100.0)
42             {
43                 lblResult.Text = "0~100 사이의 점수를 넣어주세요.";
44                 return;
45             }
46
47             scores[currIndex, 0] = scoreKor;
48             scores[currIndex, 1] = scoreEng;
49             scores[currIndex, 2] = scoreMat;
50
51             currIndex++;
52
53             lblResult.Text = $"{currIndex} 국어:{scoreKor}, 영어:{scoreEng}, 수학:{scoreMat}";
54         }
55     }
```

```

56 private void btnView_Click(object sender, EventArgs e)
57 {
58     if(currIndex == 0)
59     {
60         lblResult.Text = "조회할 내용이 없습니다.";
61         return;
62     }
63
64     string scores_list = string.Empty;
65     double sum = 0, avg = 0, max = 0.0, min = 100.0;
66
67     for(int i=0; i < currIndex; i++)//학생, 입력 순서
68     {
69         #region 학생 한명의 전체 성적
70         double sub_sum = 0.0, sub_avg = 0.0;
71         string sub_score_List = string.Empty;
72
73         for(int j=0; j < scores.GetLength(1) ; j++) //0~2 , 국어,영,수
74         {
75             sub_sum += scores[i, j];
76             sub_score_List += sub_score_List.Length > 0 ? $", {scores[i, j]}": $"{scores[i, j]}";
77         }
78
79         sub_avg = sub_sum / scores.GetLength(1);
80         sub_score_List += $" => 평균:{sub_avg,8:F2}";
81         #endregion
82
83         sum += sub_avg;
84         if (max < sub_avg) { max = sub_avg; }
85         if (min > sub_avg) { min = sub_avg; }
86
87         scores_list += sub_score_List + Environment.NewLine;
88     }
89
90     avg = sum / currIndex;
91
92     string message = $"현재인원 : {currIndex}명 {Environment.NewLine}" +
93                     $"전체점수 : {Environment.NewLine}{scores_list}" +
94                     $"평균:{avg:F2}{Environment.NewLine}" +
95                     $"최고점:{max:F2}{Environment.NewLine}" +
96                     $"최소점:{min:F2}{Environment.NewLine}";
97
98     lblResult.Text = message;
99 }
100 }
101

```

[3][4] UI 화면 동일



[3]

```
11 namespace Week4_3
12 {
13     public partial class Form1 : Form
14     {
15         public Form1()
16         {
17             InitializeComponent();
18         }
19
20         int currIndex = 0;
21         string[,] info = new string[10, 2];
22         double[,] scores = new double[10, 3];
23
24         private void btnInput_Click(object sender, EventArgs e)
25         {
26             if (currIndex >= scores.GetLength(0)) //0:1차원 1:2차원 Length:전체 요소의 갯수
27             {
28                 lblResult.Text = "더 이상 입력을 할 수 없습니다.";
29                 return;
30             }
31
32             if (string.IsNullOrEmpty(tbxNumber.Text) || string.IsNullOrEmpty(tbxName.Text))
33             {
34                 lblResult.Text = "학번/이름을 반드시 넣어주세요.";
35                 return;
36             }
37
38             if (false == double.TryParse(tbxKor.Text, out double scoreKor)
39                 || false == double.TryParse(tbxEng.Text, out double scoreEng)
40                 || false == double.TryParse(tbxMat.Text, out double scoreMat))
41             {
42                 lblResult.Text = "정확한 형식의 값을 넣어주세요.";
43                 return;
44             }
45
46             if (scoreKor < 0.0 || scoreKor > 100.0
47                 || scoreEng < 0.0 || scoreEng > 100.0
48                 || scoreMat < 0.0 || scoreMat > 100.0)
49             {
50                 lblResult.Text = "0~100 사이의 점수를 넣어주세요.";
51                 return;
52             }
53         }
54     }
55 }
```

```

53
54
55 for(int i=0; i < currIndex; i++)
56 {
57     if(info[i,0] == tbxNumber.Text.Trim())
58     {
59         lblResult.Text = "동일한 학번은 사용할 수 없습니다.";
60         return;
61     }
62
63     info[currIndex, 0] = tbxNumber.Text.Trim();
64     info[currIndex, 1] = tbxName.Text.Trim();
65
66     scores[currIndex, 0] = scoreKor;
67     scores[currIndex, 1] = scoreEng;
68     scores[currIndex, 2] = scoreMat;
69
70
71     lblResult.Text = $"{info[currIndex, 0]}/{info[currIndex, 1]} 국어:{scoreKor}, 영어:{scoreEng}, 수학:{scoreMat}";
72
73     currIndex++;
74 }
75

```

```

76 private void btnView_Click(object sender, EventArgs e)
77 {
78     if (currIndex == 0)
79     {
80         lblResult.Text = "조회할 내용이 없습니다.";
81         return;
82     }
83
84     string scores_list = string.Empty;
85     double sum = 0, avg = 0;
86     double max = 0.0, min = 100.0;
87
88     for (int i = 0; i < currIndex; i++)//학생, 입력 순서
89     {
90         #region 학생 한명의 전체 성적
91         double sub_sum = 0.0, sub_avg = 0.0;
92         string sub_score_List = string.Empty;
93
94         for (int j = 0; j < scores.GetLength(1); j++) //0~2, 국어,영,수
95         {
96             sub_sum += scores[i, j];
97             sub_score_List += sub_score_List.Length > 0 ? $", {scores[i, j]}" : $"{info[i, 0]}/{info[i, 1]} {scores[i, j]}";
98         }
99
100         sub_avg = sub_sum / scores.GetLength(1);
101         sub_score_List += $" => 평균:{sub_avg,8:F2}";
102         #endregion
103
104         sum += sub_avg;
105         if (max < sub_avg) { max = sub_avg; }
106         if (min > sub_avg) { min = sub_avg; }
107
108         scores_list += sub_score_List + Environment.NewLine;
109     }
110
111     avg = sum / currIndex;
112
113     string message =
114         $"현재인원 : {currIndex}명 {Environment.NewLine}" +
115         $"전체점수 : {Environment.NewLine}{scores_list}" +
116         $"평균:{avg:F2}{Environment.NewLine}" +
117         $"최고점:{max:F2}{Environment.NewLine}" +
118         $"최소점:{min:F2}{Environment.NewLine}";
119
120     lblResult.Text = message;
121 }
122
123 }
124

```

[4]

```
11 namespace Week4_4
12 {
13     public partial class Form1 : Form
14     {
15         public Form1()
16         {
17             InitializeComponent();
18         }
19
20         int currIndex = 0;
21         Student[] students = new Student[10]; //기본값:null
22
23         private void btnInput_Click(object sender, EventArgs e)
24         {
25             if (currIndex >= students.GetLength(0))
26             {
27                 lblResult.Text = "더 이상 입력을 할 수 없습니다.";
28                 return;
29             }
30
31             if (string.IsNullOrEmpty(tbxNumber.Text) || string.IsNullOrEmpty(tbxName.Text))
32             {
33                 lblResult.Text = "학번/이름을 반드시 넣어주세요.";
34                 return;
35             }
36
37             if (false == double.TryParse(tbxKor.Text, out double scoreKor)
38                 || false == double.TryParse(tbxEng.Text, out double scoreEng)
39                 || false == double.TryParse(tbxMat.Text, out double scoreMat))
40             {
41                 lblResult.Text = "정확한 형식의 값을 넣어주세요.";
42                 return;
43             }
44
45             if (scoreKor < 0.0 || scoreKor > 100.0
46                 || scoreEng < 0.0 || scoreEng > 100.0
47                 || scoreMat < 0.0 || scoreMat > 100.0)
48             {
49                 lblResult.Text = "0~100 사이의 점수를 넣어주세요.";
50                 return;
51             }
52
53             for (int i = 0; i < currIndex; i++)
54             {
55                 if (students[i].Number == tbxNumber.Text.Trim())
56                 {
57                     lblResult.Text = "동일한 학번은 사용할 수 없습니다.";
58                     return;
59                 }
60             }
61
62             Student stu = new Student(); //생성자 className();
63             stu.Name = tbxName.Text.Trim();
64             stu.Number = tbxNumber.Text.Trim();
65             stu.Scores[0] = scoreKor;
66             stu.Scores[1] = scoreEng;
67             stu.Scores[2] = scoreMat;
68             students[currIndex] = stu;
69
70             lblResult.Text = $"{stu.Number}/{stu.Name} 국어:{scoreKor}, 영어:{scoreEng}, 수학:{scoreMat}";
71
72             currIndex++;
73         }
74     }
75 }
```

```

74
75 private void btnView_Click(object sender, EventArgs e)
76 {
77     if (currIndex == 0)
78     {
79         lblResult.Text = "조회할 내용이 없습니다.";
80         return;
81     }
82
83     string scores_list = string.Empty;
84     double sum = 0, avg = 0;
85     double max = 0.0, min = 100.0;
86
87     for (int i = 0; i < currIndex; i++)//학생
88     {
89         #region 학생 한명의 전체 성적
90         double sub_sum = 0.0, sub_avg = 0.0;
91         string sub_score_List = string.Empty;
92
93         for (int j = 0; j < students[i].Scores.Length; j++) //0~2 , 국어,영,수
94         {
95             sub_sum += students[i].Scores[j];
96             sub_score_List += sub_score_List.Length > 0 ?
97                 $", {students[i].Scores[j]}" : $"[{students[i].Number}/{students[i].Name}] {students[i].Scores[j]}";
98         }
99
100         sub_avg = sub_sum / students[i].Scores.Length;
101         sub_score_List += $" => 평균:{sub_avg,8:F2}";
102         #endregion
103
104         sum += sub_avg;
105         if (max < sub_avg) { max = sub_avg; }
106         if (min > sub_avg) { min = sub_avg; }
107
108         scores_list += sub_score_List + Environment.NewLine;
109     }
110
111     avg = sum / currIndex;
112
113     string message =
114         $"현재인원 : {currIndex}명 {Environment.NewLine}" +
115         $"전체점수 : {Environment.NewLine}{scores_list}" +
116         $"평균:{avg:F2}{Environment.NewLine}" +
117         $"최고점:{max:F2}{Environment.NewLine}" +
118         $"최소점:{min:F2}{Environment.NewLine}";
119
120     lblResult.Text = message;
121 }
122 }
123

```

```

7 namespace Week4_4
8 {
9     class Student
10     {
11         public string Number;
12         public string Name;
13         public double[] Scores = new double[3];
14     }
15 }
16

```