1) 개요


```
클라이언트          PhotoEffect                                    PhotoFile
                                                                  +Open()
                   +ApplyEffect()                                 +Save()
                   +RemoveEffect()                                +DrawLine()
                                                                  +DrawText()
                                                                  +DrawEllipse()


  PhotoEffectXMasCard      PhotoEffectMagazin      JpegFile        GifFile         BmpFile

  +ApplyEffect()           +ApplyEffect()          +Open()         +Open()         +Open()
  +RemoveEffect()          +RemoveEffect()         +Save()         +Save()         +Save()
                                                   +DrawLine()     +DrawLine()     +DrawLine()
                                                   +DrawText()     +DrawText()     +DrawText()
                                                   +DrawEllipse()  +DrawEllipse()  +DrawEllipse()
```
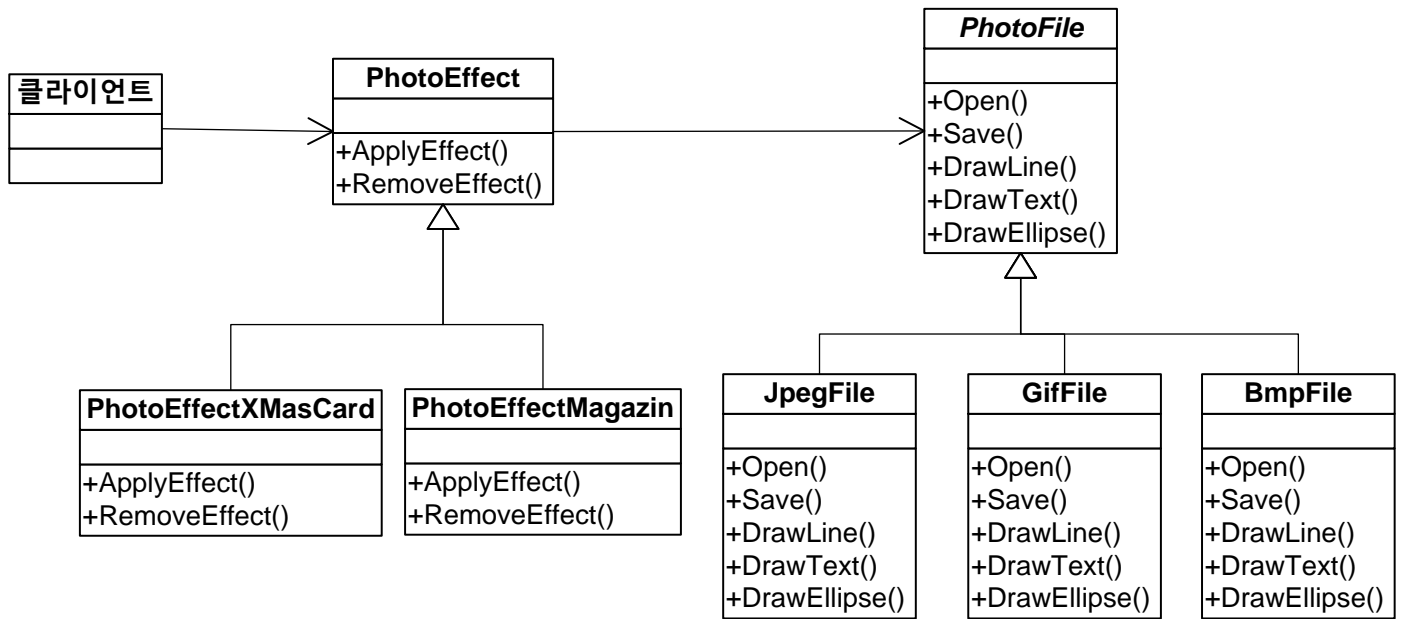
2) Example1.java

```java
1    package bridge.e1;
2
3    import java.util.Scanner;
4
5    interface PhotoFile {
6        void open(String fname);
7        void save(String fname);
8        void drawLine(int x1, int y1, int x2, int y2);
9        void drawText(int x, int y, String text);
10       void drawEllipse(int x1, int y1, int x2, int y2);
11       int getPicWidth();
12       int getPicHeight();
13   }
14
15   class JpegFile implements PhotoFile {
16       @Override
17       public void open(String fname) {
18           System.out.printf("Jpeg Open(%s.jpg)\n", fname);
19       }
20
21       @Override
22       public void save(String fname) {
23           System.out.printf("Jpeg Save(%s.jpg)\n", fname);
24       }
25
26       @Override
27       public void drawLine(int x1, int y1, int x2, int y2) {
28           System.out.printf("Jpeg DrawLine(%d, %d, %d, %d)\n", x1, y1, x2, y2);
29       }
30
31       @Override
32       public void drawText(int x, int y, String text) {
33           System.out.printf("Jpeg DrawText(%d, %d, %s)\n", x, y, text);
34       }
35
36       @Override
37       public void drawEllipse(int x1, int y1, int x2, int y2) {
38           System.out.printf("Jpeg DrawEllipse(%d, %d, %d, %d)\n", x1, y1, x2, y2);
39       }
40
41       @Override
42       public int getPicWidth() {
43           return 100;
44       }
45
46       @Override
47       public int getPicHeight() {
48           return 150;
49       }
50   };
51
52   class GifFile implements PhotoFile {
53       @Override
54       public void open(String fname) {
55           System.out.printf("Gif Open(%s.gif)\n", fname);
56       }
57
58       @Override
59       public void save(String fname) {
60           System.out.printf("Gif Save(%s.gif)\n", fname);
61       }
62
63       @Override
64       public void drawLine(int x1, int y1, int x2, int y2) {
65           System.out.printf("Gif DrawLine(%d, %d, %d, %d)\n", x1, y1, x2, y2);
66       }
67
68       @Override
```

```java
69        public void drawText(int x, int y, String text) {
70            System.out.printf("Gif DrawText(%d, %d, %s)\n", x, y, text);
71        }
72
73        @Override
74        public void drawEllipse(int x1, int y1, int x2, int y2) {
75            System.out.printf("Gif DrawEllipse(%d, %d, %d, %d)\n", x1, y1, x2, y2);
76        }
77
78        @Override
79        public int getPicWidth() {
80            return 200;
81        }
82
83        @Override
84        public int getPicHeight() {
85            return 250;
86        }
87    };
88
89    class BmpFile implements PhotoFile {
90        @Override
91        public void open(String fname) {
92            System.out.printf("Bmp Open(%s.bmp)\n", fname);
93        }
94
95        @Override
96        public void save(String fname) {
97            System.out.printf("Bmp Save(%s.bmp)\n", fname);
98        }
99
100       @Override
101       public void drawLine(int x1, int y1, int x2, int y2) {
102           System.out.printf("Bmp DrawLine(%d, %d, %d, %d)\n", x1, y1, x2, y2);
103       }
104
105       @Override
106       public void drawText(int x, int y, String text) {
107           System.out.printf("Bmp DrawText(%d, %d, %s)\n", x, y, text);
108       }
109
110       @Override
111       public void drawEllipse(int x1, int y1, int x2, int y2) {
112           System.out.printf("Bmp DrawEllipse(%d, %d, %d, %d)\n", x1, y1, x2, y2);
113       }
114
115       @Override
116       public int getPicWidth() {
117           return 300;
118       }
119
120       @Override
121       public int getPicHeight() {
122           return 350;
123       }
124   };
125
126   ////////
127
128   abstract class PhotoEffect {
129       protected PhotoFile photoFile;
130
131       public void setPhotoFile(PhotoFile p) {
132           photoFile = p;
133       }
134
135       public void open(String fname) {
136           photoFile.open(fname);
137       }
```

```java
138
139        public void save(String fname) {
140            photoFile.save(fname);
141        }
142
143        public void drawLine(int x1, int y1, int x2, int y2) {
144            photoFile.drawLine(x1, y1, x2, y2);
145        }
146
147        public void drawText(int x, int y, String text) {
148            photoFile.drawText(x, y, text);
149        }
150
151        public void drawEllipse(int x1, int y1, int x2, int y2) {
152            photoFile.drawEllipse(x1, y1, x2, y2);
153        }
154
155        public int getPicWidth() {
156            return photoFile.getPicWidth();
157        }
158
159        public int getPicHeight() {
160            return photoFile.getPicHeight();
161        }
162
163        public abstract void applyEffect(String fname);
164    };
165
166    class BorderEffect extends PhotoEffect {
167        @Override
168        public void applyEffect(String fname) {
169            open(fname);
170            int w = getPicWidth();
171            int h = getPicHeight();
172            drawLine(0, 0, w, 0);
173            drawLine(w, 0, w, h);
174            drawLine(w, h, 0, h);
175            drawLine(0, h, 0, 0);
176            save(fname);
177        }
178    };
179
180    class BallonEffect extends PhotoEffect {
181        String text;
182
183        public BallonEffect(String s) {
184            text = s;
185        }
186
187        @Override
188        public void applyEffect(String fname) {
189            open(fname);
190            drawEllipse(100, 100, 300, 200);
191            drawText(150, 140, text);
192            save(fname);
193        }
194    };
195
196    ////////
197
198    public class Example1 {
199
200        public static void main(String[] args) {
201            PhotoFile imp;
202            PhotoEffect effect = null;
203
204            for (;;) {
205                Scanner scanner = new Scanner(System.in);
206                System.out.printf("\nPic 1)Jpeg  2)Gif  3)Bmp  0)Quit: ");
```

```
207              switch (scanner.next().charAt(0)) {
208              case '1':
209                  imp = new JpegFile();
210                  break;
211              case '2':
212                  imp = new GifFile();
213                  break;
214              case '3':
215                  imp = new BmpFile();
216                  break;
217              default:
218                  return;
219              }
220              System.out.printf("Effect 1)Border  2)Ballon  0)Quit: ");
221              switch (scanner.next().charAt(0)) {
222              case '1':
223                  effect = new BorderEffect();
224                  break;
225              case '2':
226                  effect = new BallonEffect("hello");
227                  break;
228              }
229
230              effect.setPhotoFile(imp);
231              effect.applyEffect("picfile");
232
233          }
234      }
235 }
```

실행 사례

```
Pic 1)Jpeg  2)Gif  3)Bmp  0)Quit: 1
Effect 1)Border  2)Ballon  0)Quit: 2

Jpeg Open(picfile.jpg)
Jpeg DrawEllipse(100, 100, 300, 200)
Jpeg DrawText(150, 140, hello)
Jpeg Save(picfile.jpg)

Pic 1)Jpeg  2)Gif  3)Bmp  0)Quit: 2
Effect 1)Border  2)Ballon  0)Quit: 1

Gif Open(picfile.gif)
Gif DrawLine(0, 0, 200, 0)
Gif DrawLine(200, 0, 200, 250)
Gif DrawLine(200, 250, 0, 250)
Gif DrawLine(0, 250, 0, 0)
Gif Save(picfile.gif)

Pic 1)Jpeg  2)Gif  3)Bmp  0)Quit: 0
```