

20 键盘事件

20.1 键盘事件处理函数

QWidget类中包含如下虚函数，提供对键盘事件的处理：

```
1 virtual void keyPressEvent(QKeyEvent* e); // 键盘键按下事件处理函数
2 virtual void keyReleaseEvent(QKeyEvent* e); // 键盘键弹起事件处理函数
```

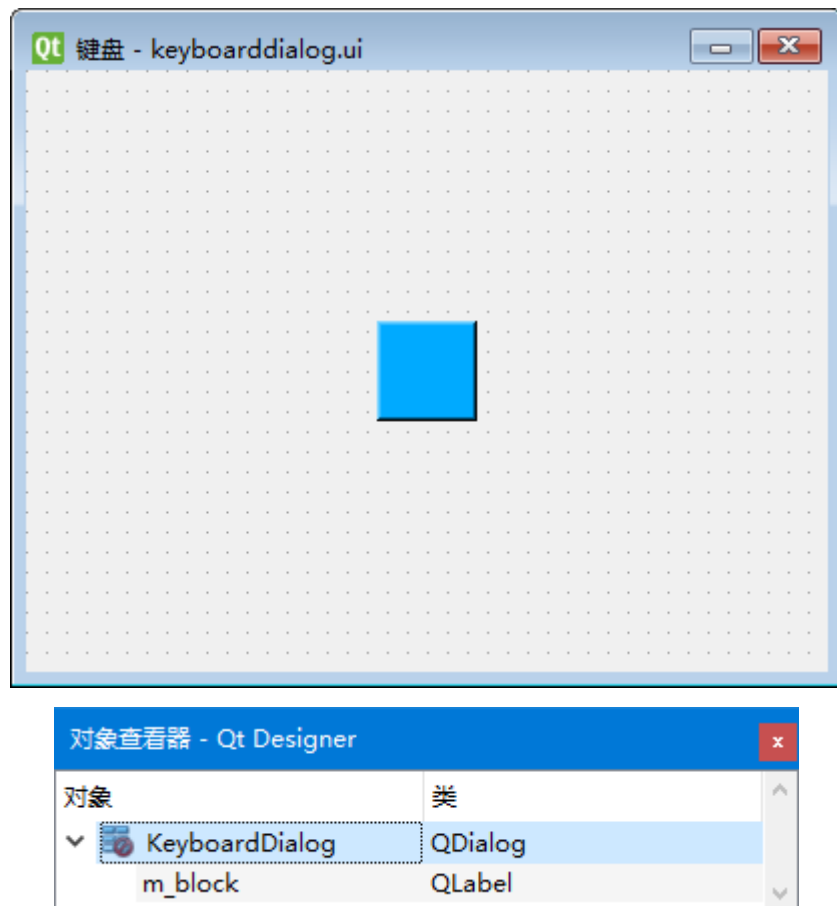
其参数QKeyEvent描述了事件发生时的细节，如具体哪个键盘键按下、弹起，按键上的字符，等等。

20.2 案例

20.2.1 创建项目

通过QtCreator，在C:\Users\Minwei\Projects\Qt路径下，创建名为Keyboard的项目。

20.2.2 设计界面



C:\Users\Minwei\Projects\Qt\Keyboard\keyboarddialog.ui:

```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <ui version="4.0">
3   <class>KeyboardDialog</class>
4   <widget class="QDialog" name="keyboardDialog">
5     <property name="geometry">
6       <rect>
7         <x>0</x>
8         <y>0</y>
```

```
9      <width>400</width>
10      <height>300</height>
11    </rect>
12  </property>
13  <property name="windowTitle">
14    <string>键盘</string>
15  </property>
16  <widget class="QLabel" name="m_block">
17    <property name="geometry">
18      <rect>
19        <x>175</x>
20        <y>125</y>
21        <width>50</width>
22        <height>50</height>
23      </rect>
24    </property>
25    <property name="palette">
26      <palette>
27        <active>
28          <colorrole role="WindowText">
29            <brush brushstyle="SolidPattern">
30              <color alpha="255">
31                <red>0</red>
32                <green>0</green>
33                <blue>0</blue>
34              </color>
35            </brush>
36          </colorrole>
37          <colorrole role="Button">
38            <brush brushstyle="SolidPattern">
39              <color alpha="255">
40                <red>0</red>
41                <green>170</green>
42                <blue>255</blue>
43              </color>
44            </brush>
45          </colorrole>
46          <colorrole role="Light">
47            <brush brushstyle="SolidPattern">
48              <color alpha="255">
49                <red>127</red>
50                <green>213</green>
51                <blue>255</blue>
52              </color>
53            </brush>
54          </colorrole>
55          <colorrole role="Midlight">
56            <brush brushstyle="SolidPattern">
57              <color alpha="255">
58                <red>63</red>
59                <green>191</green>
60                <blue>255</blue>
61              </color>
62            </brush>
63          </colorrole>
64          <colorrole role="Dark">
```

```
65     <brush brushstyle="SolidPattern">
66         <color alpha="255">
67             <red>0</red>
68             <green>85</green>
69             <blue>127</blue>
70         </color>
71     </brush>
72 </colorrole>
73 <colorrole role="Mid">
74     <brush brushstyle="SolidPattern">
75         <color alpha="255">
76             <red>0</red>
77             <green>113</green>
78             <blue>170</blue>
79         </color>
80     </brush>
81 </colorrole>
82 <colorrole role="Text">
83     <brush brushstyle="SolidPattern">
84         <color alpha="255">
85             <red>0</red>
86             <green>0</green>
87             <blue>0</blue>
88         </color>
89     </brush>
90 </colorrole>
91 <colorrole role="BrightText">
92     <brush brushstyle="SolidPattern">
93         <color alpha="255">
94             <red>255</red>
95             <green>255</green>
96             <blue>255</blue>
97         </color>
98     </brush>
99 </colorrole>
100 <colorrole role="ButtonText">
101     <brush brushstyle="SolidPattern">
102         <color alpha="255">
103             <red>0</red>
104             <green>0</green>
105             <blue>0</blue>
106         </color>
107     </brush>
108 </colorrole>
109 <colorrole role="Base">
110     <brush brushstyle="SolidPattern">
111         <color alpha="255">
112             <red>255</red>
113             <green>255</green>
114             <blue>255</blue>
115         </color>
116     </brush>
117 </colorrole>
118 <colorrole role="Window">
119     <brush brushstyle="SolidPattern">
120         <color alpha="255">
```

```
121         <red>0</red>
122         <green>170</green>
123         <blue>255</blue>
124     </color>
125 </brush>
126 </colorrole>
127 <colorrole role="Shadow">
128     <brush brushstyle="SolidPattern">
129         <color alpha="255">
130             <red>0</red>
131             <green>0</green>
132             <blue>0</blue>
133         </color>
134     </brush>
135 </colorrole>
136 <colorrole role="AlternateBase">
137     <brush brushstyle="SolidPattern">
138         <color alpha="255">
139             <red>127</red>
140             <green>212</green>
141             <blue>255</blue>
142         </color>
143     </brush>
144 </colorrole>
145 <colorrole role="ToolTipBase">
146     <brush brushstyle="SolidPattern">
147         <color alpha="255">
148             <red>255</red>
149             <green>255</green>
150             <blue>220</blue>
151         </color>
152     </brush>
153 </colorrole>
154 <colorrole role="ToolTipText">
155     <brush brushstyle="SolidPattern">
156         <color alpha="255">
157             <red>0</red>
158             <green>0</green>
159             <blue>0</blue>
160         </color>
161     </brush>
162 </colorrole>
163 <colorrole role="PlaceholderText">
164     <brush brushstyle="SolidPattern">
165         <color alpha="128">
166             <red>0</red>
167             <green>0</green>
168             <blue>0</blue>
169         </color>
170     </brush>
171 </colorrole>
172 </active>
173 <inactive>
174     <colorrole role="WindowText">
175         <brush brushstyle="SolidPattern">
176             <color alpha="255">
```

```
177         <red>0</red>
178         <green>0</green>
179         <blue>0</blue>
180     </color>
181 </brush>
182 </colorrole>
183 <colorrole role="Button">
184     <brush brushstyle="SolidPattern">
185         <color alpha="255">
186             <red>0</red>
187             <green>170</green>
188             <blue>255</blue>
189         </color>
190     </brush>
191 </colorrole>
192 <colorrole role="Light">
193     <brush brushstyle="SolidPattern">
194         <color alpha="255">
195             <red>127</red>
196             <green>213</green>
197             <blue>255</blue>
198         </color>
199     </brush>
200 </colorrole>
201 <colorrole role="Midlight">
202     <brush brushstyle="SolidPattern">
203         <color alpha="255">
204             <red>63</red>
205             <green>191</green>
206             <blue>255</blue>
207         </color>
208     </brush>
209 </colorrole>
210 <colorrole role="Dark">
211     <brush brushstyle="SolidPattern">
212         <color alpha="255">
213             <red>0</red>
214             <green>85</green>
215             <blue>127</blue>
216         </color>
217     </brush>
218 </colorrole>
219 <colorrole role="Mid">
220     <brush brushstyle="SolidPattern">
221         <color alpha="255">
222             <red>0</red>
223             <green>113</green>
224             <blue>170</blue>
225         </color>
226     </brush>
227 </colorrole>
228 <colorrole role="Text">
229     <brush brushstyle="SolidPattern">
230         <color alpha="255">
231             <red>0</red>
232             <green>0</green>
```

```
233         <blue>0</blue>
234     </color>
235 </brush>
236 </colorrole>
237 <colorrole role="BrightText">
238     <brush brushstyle="SolidPattern">
239         <color alpha="255">
240             <red>255</red>
241             <green>255</green>
242             <blue>255</blue>
243         </color>
244     </brush>
245 </colorrole>
246 <colorrole role="ButtonText">
247     <brush brushstyle="SolidPattern">
248         <color alpha="255">
249             <red>0</red>
250             <green>0</green>
251             <blue>0</blue>
252         </color>
253     </brush>
254 </colorrole>
255 <colorrole role="Base">
256     <brush brushstyle="SolidPattern">
257         <color alpha="255">
258             <red>255</red>
259             <green>255</green>
260             <blue>255</blue>
261         </color>
262     </brush>
263 </colorrole>
264 <colorrole role="Window">
265     <brush brushstyle="SolidPattern">
266         <color alpha="255">
267             <red>0</red>
268             <green>170</green>
269             <blue>255</blue>
270         </color>
271     </brush>
272 </colorrole>
273 <colorrole role="Shadow">
274     <brush brushstyle="SolidPattern">
275         <color alpha="255">
276             <red>0</red>
277             <green>0</green>
278             <blue>0</blue>
279         </color>
280     </brush>
281 </colorrole>
282 <colorrole role="AlternateBase">
283     <brush brushstyle="SolidPattern">
284         <color alpha="255">
285             <red>127</red>
286             <green>212</green>
287             <blue>255</blue>
288         </color>
```

```
289     </brush>
290 </colorrole>
291 <colorrole role="ToolTipBase">
292     <brush brushstyle="SolidPattern">
293         <color alpha="255">
294             <red>255</red>
295             <green>255</green>
296             <blue>220</blue>
297         </color>
298     </brush>
299 </colorrole>
300 <colorrole role="ToolTipText">
301     <brush brushstyle="SolidPattern">
302         <color alpha="255">
303             <red>0</red>
304             <green>0</green>
305             <blue>0</blue>
306         </color>
307     </brush>
308 </colorrole>
309 <colorrole role="PlaceholderText">
310     <brush brushstyle="SolidPattern">
311         <color alpha="128">
312             <red>0</red>
313             <green>0</green>
314             <blue>0</blue>
315         </color>
316     </brush>
317 </colorrole>
318 </inactive>
319 <disabled>
320     <colorrole role="WindowText">
321         <brush brushstyle="SolidPattern">
322             <color alpha="255">
323                 <red>0</red>
324                 <green>85</green>
325                 <blue>127</blue>
326             </color>
327         </brush>
328     </colorrole>
329     <colorrole role="Button">
330         <brush brushstyle="SolidPattern">
331             <color alpha="255">
332                 <red>0</red>
333                 <green>170</green>
334                 <blue>255</blue>
335             </color>
336         </brush>
337     </colorrole>
338     <colorrole role="Light">
339         <brush brushstyle="SolidPattern">
340             <color alpha="255">
341                 <red>127</red>
342                 <green>213</green>
343                 <blue>255</blue>
344             </color>
```

```
345     </brush>
346 </colorrole>
347 <colorrole role="Midlight">
348     <brush brushstyle="SolidPattern">
349         <color alpha="255">
350             <red>63</red>
351             <green>191</green>
352             <blue>255</blue>
353         </color>
354     </brush>
355 </colorrole>
356 <colorrole role="Dark">
357     <brush brushstyle="SolidPattern">
358         <color alpha="255">
359             <red>0</red>
360             <green>85</green>
361             <blue>127</blue>
362         </color>
363     </brush>
364 </colorrole>
365 <colorrole role="Mid">
366     <brush brushstyle="SolidPattern">
367         <color alpha="255">
368             <red>0</red>
369             <green>113</green>
370             <blue>170</blue>
371         </color>
372     </brush>
373 </colorrole>
374 <colorrole role="Text">
375     <brush brushstyle="SolidPattern">
376         <color alpha="255">
377             <red>0</red>
378             <green>85</green>
379             <blue>127</blue>
380         </color>
381     </brush>
382 </colorrole>
383 <colorrole role="BrightText">
384     <brush brushstyle="SolidPattern">
385         <color alpha="255">
386             <red>255</red>
387             <green>255</green>
388             <blue>255</blue>
389         </color>
390     </brush>
391 </colorrole>
392 <colorrole role="ButtonText">
393     <brush brushstyle="SolidPattern">
394         <color alpha="255">
395             <red>0</red>
396             <green>85</green>
397             <blue>127</blue>
398         </color>
399     </brush>
400 </colorrole>
```

```
401 <colorrole role="Base">
402   <brush brushstyle="SolidPattern">
403     <color alpha="255">
404       <red>0</red>
405       <green>170</green>
406       <blue>255</blue>
407     </color>
408   </brush>
409 </colorrole>
410 <colorrole role="Window">
411   <brush brushstyle="SolidPattern">
412     <color alpha="255">
413       <red>0</red>
414       <green>170</green>
415       <blue>255</blue>
416     </color>
417   </brush>
418 </colorrole>
419 <colorrole role="Shadow">
420   <brush brushstyle="SolidPattern">
421     <color alpha="255">
422       <red>0</red>
423       <green>0</green>
424       <blue>0</blue>
425     </color>
426   </brush>
427 </colorrole>
428 <colorrole role="AlternateBase">
429   <brush brushstyle="SolidPattern">
430     <color alpha="255">
431       <red>0</red>
432       <green>170</green>
433       <blue>255</blue>
434     </color>
435   </brush>
436 </colorrole>
437 <colorrole role="ToolTipBase">
438   <brush brushstyle="SolidPattern">
439     <color alpha="255">
440       <red>255</red>
441       <green>255</green>
442       <blue>220</blue>
443     </color>
444   </brush>
445 </colorrole>
446 <colorrole role="ToolTipText">
447   <brush brushstyle="SolidPattern">
448     <color alpha="255">
449       <red>0</red>
450       <green>0</green>
451       <blue>0</blue>
452     </color>
453   </brush>
454 </colorrole>
455 <colorrole role="PlaceholderText">
456   <brush brushstyle="SolidPattern">
```

```

457         <color alpha="128">
458             <red>0</red>
459             <green>0</green>
460             <blue>0</blue>
461         </color>
462     </brush>
463 </colorrole>
464 </disabled>
465 </palette>
466 </property>
467 <property name="autoFillBackground">
468     <bool>true</bool>
469 </property>
470 <property name="frameShape">
471     <enum>QFrame::WinPanel</enum>
472 </property>
473 <property name="frameShadow">
474     <enum>QFrame::Raised</enum>
475 </property>
476 <property name="text">
477     <string/>
478 </property>
479 </widget>
480 </widget>
481 <resources/>
482 <connections/>
483 </ui>

```

20.2.3 实现功能

C:\Users\Minwei\Projects\Qt\Keyboard\keyboarddialog.h:

```

1  #ifndef KEYBOARDIALOG_H
2  #define KEYBOARDIALOG_H
3
4  #include <QDialog>
5
6  QT_BEGIN_NAMESPACE
7  namespace Ui { class KeyboardDialog; }
8  QT_END_NAMESPACE
9
10 class KeyboardDialog : public QDialog
11 {
12     Q_OBJECT
13
14 public:
15     KeyboardDialog(QWidget *parent = nullptr);
16     ~KeyboardDialog();
17
18 protected:
19     void keyPressEvent(QKeyEvent* e);
20
21 private:
22     Ui::KeyboardDialog *ui;
23 };

```

```
24
25 #endif // KEYBOARDIALOG_H
```

C:\Users\Minwei\Projects\Qt\Keyboard\keyboarddialog.cpp:

```
1  #include <algorithm>
2  using namespace std;
3
4  #include <QKeyEvent>
5
6  #include "keyboarddialog.h"
7  #include "ui_keyboarddialog.h"
8
9  keyboardDialog::keyboardDialog(QWidget *parent)
10      : QDialog(parent)
11      , ui(new Ui::keyboardDialog)
12  {
13      ui->setupUi(this);
14  }
15
16  keyboardDialog::~keyboardDialog()
17  {
18      delete ui;
19  }
20
21  void keyboardDialog::keyPressEvent(QKeyEvent* e)
22  {
23      QPoint blockPos = ui->m_block->pos();
24      switch (e->key())
25      {
26          case Qt::Key_Left:
27              blockPos.setX(blockPos.x() - 10);
28              break;
29
30          case Qt::Key_Right:
31              blockPos.setX(blockPos.x() + 10);
32              break;
33
34          case Qt::Key_Up:
35              blockPos.setY(blockPos.y() - 10);
36              break;
37
38          case Qt::Key_Down:
39              blockPos.setY(blockPos.y() + 10);
40              break;
41      }
42
43      QSize windowSize = size();
44      QSize blockSize = ui->m_block->size();
45
46      int xmin = 0, xmax = windowSize.width() - blockSize.width();
47      int ymin = 0, ymax = windowSize.height() - blockSize.height();
48
49      blockPos.setX(min(max(blockPos.x(), xmin), xmax));
50      blockPos.setY(min(max(blockPos.y(), ymin), ymax));
```

```
51  
52     ui->m_block->move(blockPos);  
53 }
```

20.2.4 测试验证

运行效果如图所示：

