

# 19 鼠标事件

## 19.1 鼠标事件处理函数

QWidget类中包含如下虚函数，提供对鼠标事件的处理：

```
1 virtual void mousePressEvent(QMouseEvent* e); // 鼠标键按下事件处理函数
2 virtual void mouseReleaseEvent(QMouseEvent* e); // 鼠标键弹起事件处理函数
3 virtual void mouseDoubleClickEvent(QMouseEvent* e); // 鼠标键双击事件处理函数
4 virtual void mouseMoveEvent(QMouseEvent* e); // 鼠标移动事件处理函数
```

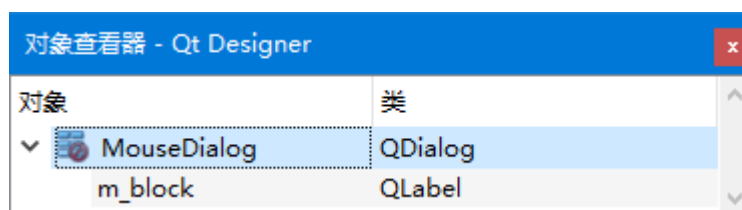
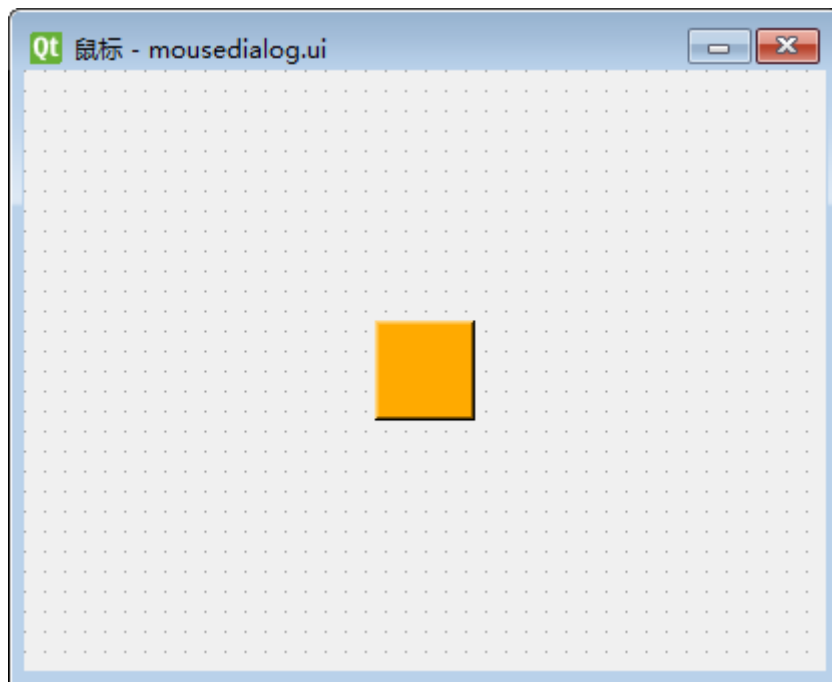
其参数QMouseEvent描述了事件发生时的细节，如具体哪个鼠标键按下、弹起或双击，鼠标所在位置，等等。

## 19.2 案例

### 19.2.1 创建项目

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

### 19.2.2 设计界面



C:\Users\Minwei\Projects\Qt\Mouse\mousedialog.ui:

```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <ui version="4.0">
3 <class>MouseDialog</class>
4 <widget class="QDialog" name="MouseDialog">
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>鼠标</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>255</red>
41 <green>170</green>
42 <blue>0</blue>
43 </color>
44 </brush>
45 </colorrole>
46 <colorrole role="Light">
47 <brush brushstyle="SolidPattern">
48 <color alpha="255">
49 <red>255</red>
50 <green>213</green>
51 <blue>127</blue>
52 </color>
53 </brush>
54 </colorrole>
55 <colorrole role="Midlight">
56 <brush brushstyle="SolidPattern">
57 <color alpha="255">
58 <red>255</red>
59 <green>191</green>
60 <blue>63</blue>
61 </color>
```

```
62     </brush>
63 </colorrole>
64 <colorrole role="Dark">
65     <brush brushstyle="SolidPattern">
66         <color alpha="255">
67             <red>127</red>
68             <green>85</green>
69             <blue>0</blue>
70         </color>
71     </brush>
72 </colorrole>
73 <colorrole role="Mid">
74     <brush brushstyle="SolidPattern">
75         <color alpha="255">
76             <red>170</red>
77             <green>113</green>
78             <blue>0</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>255</red>
122       <green>170</green>
123       <blue>0</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>255</red>
140       <green>212</green>
141       <blue>127</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>255</red>
187       <green>170</green>
188       <blue>0</blue>
189     </color>
190   </brush>
191 </colorrole>
192 <colorrole role="Light">
193   <brush brushstyle="SolidPattern">
194     <color alpha="255">
195       <red>255</red>
196       <green>213</green>
197       <blue>127</blue>
198     </color>
199   </brush>
200 </colorrole>
201 <colorrole role="Midlight">
202   <brush brushstyle="SolidPattern">
203     <color alpha="255">
204       <red>255</red>
205       <green>191</green>
206       <blue>63</blue>
207     </color>
208   </brush>
209 </colorrole>
210 <colorrole role="Dark">
211   <brush brushstyle="SolidPattern">
212     <color alpha="255">
213       <red>127</red>
214       <green>85</green>
215       <blue>0</blue>
216     </color>
217   </brush>
218 </colorrole>
219 <colorrole role="Mid">
220   <brush brushstyle="SolidPattern">
221     <color alpha="255">
222       <red>170</red>
223       <green>113</green>
224       <blue>0</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>255</red>
268     <green>170</green>
269     <blue>0</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>255</red>
```

```
286     <green>212</green>
287     <blue>127</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>127</red>
324     <green>85</green>
325     <blue>0</blue>
326     </color>
327     </brush>
328 </colorrole>
329 <colorrole role="Button">
330     <brush brushstyle="SolidPattern">
331     <color alpha="255">
332     <red>255</red>
333     <green>170</green>
334     <blue>0</blue>
335     </color>
336     </brush>
337 </colorrole>
338 <colorrole role="Light">
339     <brush brushstyle="SolidPattern">
340     <color alpha="255">
341     <red>255</red>
```

```
342     <green>213</green>
343     <blue>127</blue>
344     </color>
345     </brush>
346 </colorrole>
347 <colorrole role="Midlight">
348     <brush brushstyle="SolidPattern">
349         <color alpha="255">
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351             <green>191</green>
352             <blue>63</blue>
353         </color>
354     </brush>
355 </colorrole>
356 <colorrole role="Dark">
357     <brush brushstyle="SolidPattern">
358         <color alpha="255">
359             <red>127</red>
360             <green>85</green>
361             <blue>0</blue>
362         </color>
363     </brush>
364 </colorrole>
365 <colorrole role="Mid">
366     <brush brushstyle="SolidPattern">
367         <color alpha="255">
368             <red>170</red>
369             <green>113</green>
370             <blue>0</blue>
371         </color>
372     </brush>
373 </colorrole>
374 <colorrole role="Text">
375     <brush brushstyle="SolidPattern">
376         <color alpha="255">
377             <red>127</red>
378             <green>85</green>
379             <blue>0</blue>
380         </color>
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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>127</red>
396             <green>85</green>
397             <blue>0</blue>
```



```
398     </color>
399   </brush>
400 </colorrole>
401 <colorrole role="Base">
402   <brush brushstyle="SolidPattern">
403     <color alpha="255">
404       <red>255</red>
405       <green>170</green>
406       <blue>0</blue>
407     </color>
408   </brush>
409 </colorrole>
410 <colorrole role="window">
411   <brush brushstyle="SolidPattern">
412     <color alpha="255">
413       <red>255</red>
414       <green>170</green>
415       <blue>0</blue>
416     </color>
417   </brush>
418 </colorrole>
419 <colorrole role="Shadow">
420   <brush brushstyle="SolidPattern">
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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>255</red>
432       <green>170</green>
433       <blue>0</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>

```

### 19.2.3 实现功能

C:\Users\Minwei\Projects\Qt\Mouse\mousedialog.h:

```

1  #ifndef MOUSEDIALOG_H
2  #define MOUSEDIALOG_H
3
4  #include <QDialog>
5
6  QT_BEGIN_NAMESPACE
7  namespace Ui { class MouseDialog; }
8  QT_END_NAMESPACE
9
10 class MouseDialog : public QDialog
11 {
12     Q_OBJECT
13
14 public:
15     MouseDialog(QWidget *parent = nullptr);
16     ~MouseDialog();
17
18 protected:
19     void mousePressEvent(QMouseEvent* e);
20     void mouseReleaseEvent(QMouseEvent* e);

```

```

21     void mouseMoveEvent(QMouseEvent* e);
22
23 private:
24     Ui::MouseDialog *ui;
25     bool m_dragging;
26     QPoint m_offset;
27 };
28
29 #endif // MOUSEDIALOG_H

```

C:\Users\Minwei\Projects\Qt\Mouse\mousedialog.cpp:

```

1  #include <algorithm>
2  using namespace std;
3
4  #include <QMouseEvent>
5
6  #include "mousedialog.h"
7  #include "ui_mousedialog.h"
8
9  MouseDialog::MouseDialog(QWidget *parent)
10     : QDialog(parent)
11     , ui(new Ui::MouseDialog)
12     , m_dragging(false)
13 {
14     ui->setupUi(this);
15 }
16
17 MouseDialog::~MouseDialog()
18 {
19     delete ui;
20 }
21
22 void MouseDialog::mousePressEvent(QMouseEvent* e)
23 {
24     if (e->button() == Qt::LeftButton)
25     {
26         QRect blockRect = ui->m_block->frameRect();
27         blockRect.translate(ui->m_block->pos());
28
29         if (blockRect.contains(e->pos()))
30         {
31             m_dragging = true;
32             m_offset = ui->m_block->pos() - e->pos();
33         }
34     }
35 }
36
37 void MouseDialog::mouseReleaseEvent(QMouseEvent* e)
38 {
39     if (e->button() == Qt::LeftButton)
40         m_dragging = false;
41 }
42
43 void MouseDialog::mouseMoveEvent(QMouseEvent* e)

```

```
44 {
45     if (m_dragging)
46     {
47         QPoint blockPos = e->pos() + m_offset;
48
49         QSize windowSize = size();
50         QSize blockSize = ui->m_block->size();
51
52         int xMin = 0, xMax = windowSize.width() - blockSize.width();
53         int yMin = 0, yMax = windowSize.height() - blockSize.height();
54
55         blockPos.setX(min(max(blockPos.x(), xMin), xMax));
56         blockPos.setY(min(max(blockPos.y(), yMin), yMax));
57
58         ui->m_block->move(blockPos);
59     }
60 }
```

## 19.2.4 测试验证

运行效果如图所示：

