

# 94 界面实现

第一步，先构建TcpServer和TcpClient两个项目的基本框架和用户界面。

## 94.1 TcpServer

### 94.1.1 创建项目

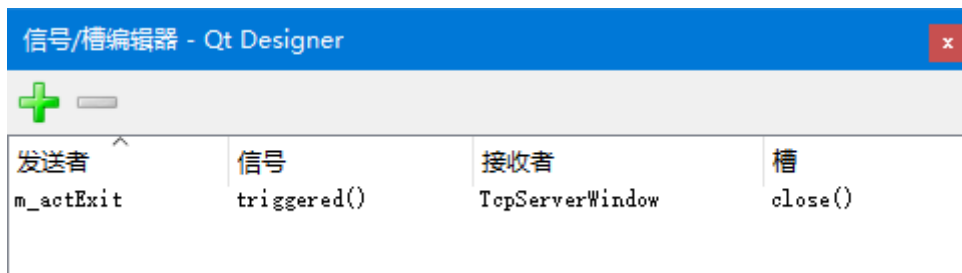
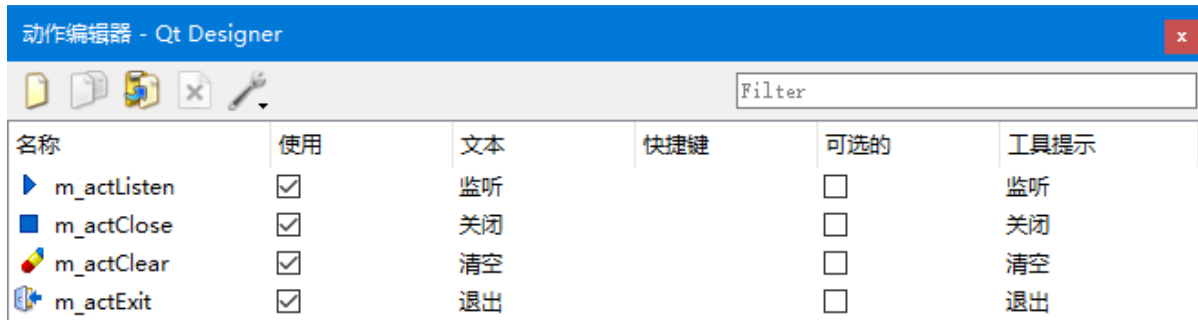
通过QtCreator，在C:\Users\Minwei\Projects\Qt路径下，创建名为TcpServer的项目。

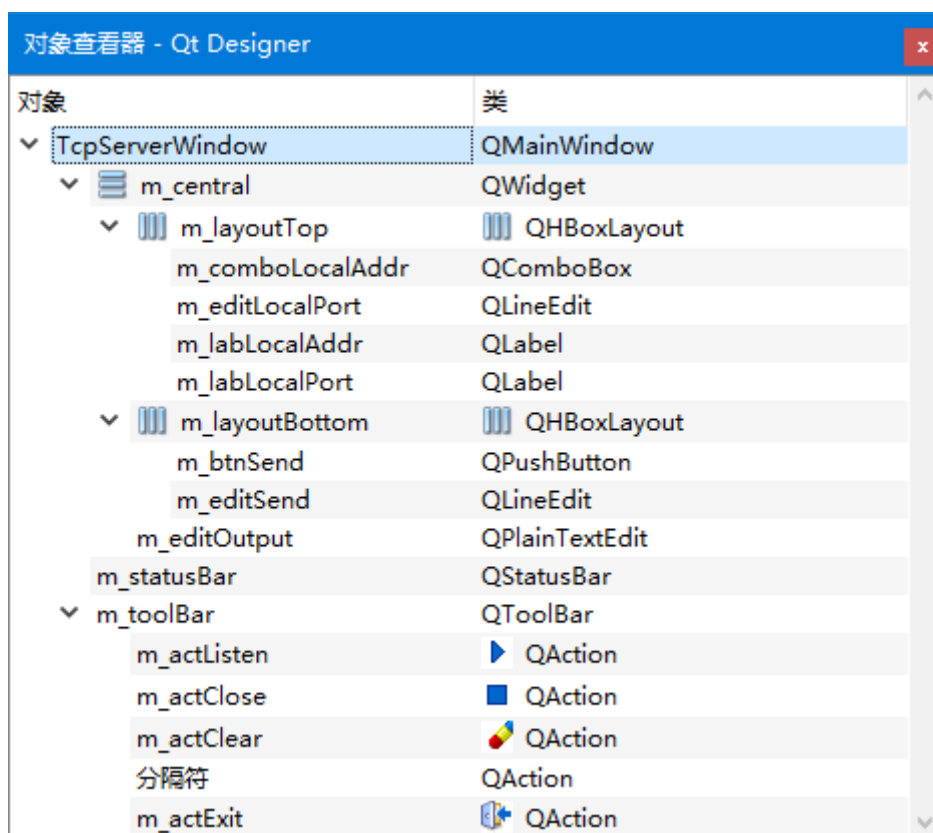
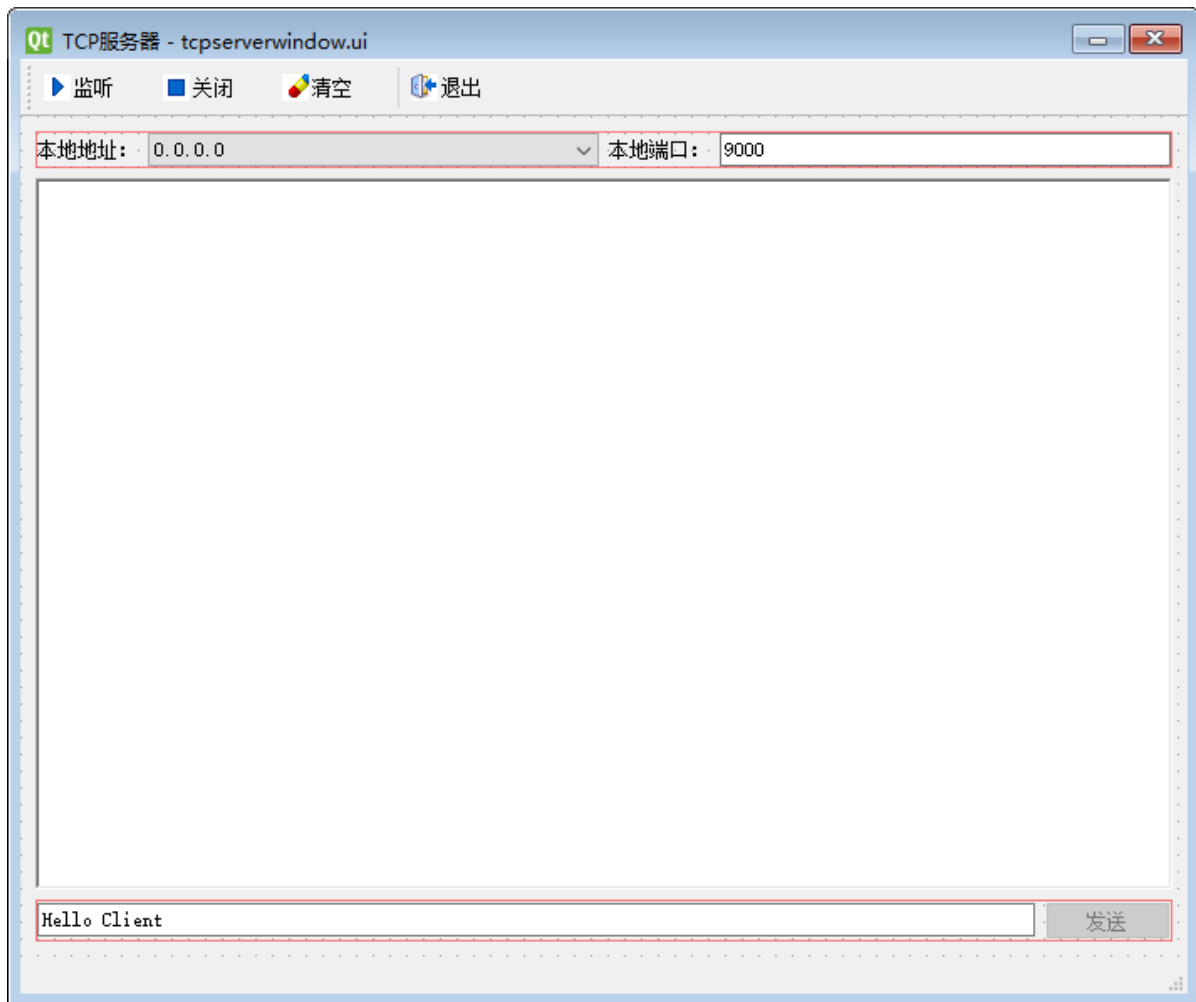
### 94.1.2 添加资源

C:\Users\Minwei\Projects\Qt\TcpServer\TcpServer.qrc:

```
1 <RCC>
2     <qresource prefix="/">
3         <file>images/clear.bmp</file>
4         <file>images/close.bmp</file>
5         <file>images/exit.bmp</file>
6         <file>images/listen.bmp</file>
7     </qresource>
8 </RCC>
```

### 94.1.3 设计界面





C:\Users\Minwei\Projects\Qt\TcpServer\tcpserverwindow.ui:

```

1 <?xml version="1.0" encoding="UTF-8"?>
2 <ui version="4.0">
3 <class>TcpServerWindow</class>

```

```
4 <widget class="QMainWindow" name="TcpServerwindow">
5   <property name="geometry">
6     <rect>
7       <x>0</x>
8       <y>0</y>
9       <width>696</width>
10      <height>557</height>
11    </rect>
12  </property>
13  <property name="windowTitle">
14    <string>TCP服务器</string>
15  </property>
16  <widget class="QWidget" name="m_central">
17    <layout class="QVBoxLayout" name="m_layoutVer">
18      <item>
19        <layout class="QHBoxLayout" name="m_layoutTop">
20          <item>
21            <widget class="QLabel" name="m_labLocalAddr">
22              <property name="sizePolicy">
23                <sizepolicy hsizeType="Fixed" vsizeType="Preferred">
24                  <horstretch>0</horstretch>
25                  <verstretch>0</verstretch>
26                </sizepolicy>
27              </property>
28              <property name="text">
29                <string>本地地址: </string>
30              </property>
31            </widget>
32          </item>
33          <item>
34            <widget class="QComboBox" name="m_comboLocalAddr">
35              <item>
36                <property name="text">
37                  <string>0.0.0.0</string>
38                </property>
39              </item>
40              <item>
41                <property name="text">
42                  <string>127.0.0.1</string>
43                </property>
44              </item>
45            </widget>
46          </item>
47          <item>
48            <widget class="QLabel" name="m_labLocalPort">
49              <property name="sizePolicy">
50                <sizepolicy hsizeType="Fixed" vsizeType="Preferred">
51                  <horstretch>0</horstretch>
52                  <verstretch>0</verstretch>
53                </sizepolicy>
54              </property>
55              <property name="text">
56                <string>本地端口: </string>
57              </property>
58            </widget>
59          </item>
```

```
60     <item>
61         <widget class="QLineEdit" name="m_editLocalPort">
62             <property name="sizePolicy">
63                 <sizepolicy hsizeType="Preferred" vsizeType="Fixed">
64                     <horstretch>0</horstretch>
65                     <verstretch>0</verstretch>
66                 </sizepolicy>
67             </property>
68             <property name="text">
69                 <string>9000</string>
70             </property>
71         </widget>
72     </item>
73 </layout>
74 </item>
75 <item>
76     <widget class="QPlainTextEdit" name="m_editOutput">
77         <property name="frameShape">
78             <enum>QFrame::WinPanel</enum>
79         </property>
80         <property name="readOnly">
81             <bool>true</bool>
82         </property>
83     </widget>
84 </item>
85 <item>
86     <layout class="QHBoxLayout" name="m_layoutBottom">
87         <item>
88             <widget class="QLineEdit" name="m_editSend">
89                 <property name="text">
90                     <string>Hello Client</string>
91                 </property>
92             </widget>
93         </item>
94         <item>
95             <widget class="QPushButton" name="m_btnSend">
96                 <property name="enabled">
97                     <bool>>false</bool>
98                 </property>
99                 <property name="text">
100                     <string>发送</string>
101                 </property>
102                 <property name="default">
103                     <bool>true</bool>
104                 </property>
105             </widget>
106         </item>
107     </layout>
108 </item>
109 </layout>
110 </widget>
111 <widget class="QStatusBar" name="m_statusBar"/>
112 <widget class="QToolBar" name="m_toolBar">
113     <property name="windowTitle">
114         <string>toolBar</string>
115     </property>
```

```

116 <property name="toolButtonStyle">
117 <enum>Qt::ToolButtonTextBesideIcon</enum>
118 </property>
119 <attribute name="toolBarArea">
120 <enum>TopToolBarArea</enum>
121 </attribute>
122 <attribute name="toolBarBreak">
123 <bool>>false</bool>
124 </attribute>
125 <addaction name="m_actListen"/>
126 <addaction name="m_actClose"/>
127 <addaction name="m_actClear"/>
128 <addaction name="separator"/>
129 <addaction name="m_actExit"/>
130 </widget>
131 <action name="m_actListen">
132 <property name="icon">
133 <iconset resource="TcpServer.qrc">
134 <normaloff>:/images/listen.bmp</normaloff>:/images/listen.bmp</iconset>
135 </property>
136 <property name="text">
137 <string>监听</string>
138 </property>
139 <property name="toolTip">
140 <string>监听</string>
141 </property>
142 </action>
143 <action name="m_actClose">
144 <property name="icon">
145 <iconset resource="TcpServer.qrc">
146 <normaloff>:/images/close.bmp</normaloff>:/images/close.bmp</iconset>
147 </property>
148 <property name="text">
149 <string>关闭</string>
150 </property>
151 <property name="toolTip">
152 <string>关闭</string>
153 </property>
154 </action>
155 <action name="m_actClear">
156 <property name="icon">
157 <iconset resource="TcpServer.qrc">
158 <normaloff>:/images/clear.bmp</normaloff>:/images/clear.bmp</iconset>
159 </property>
160 <property name="text">
161 <string>清空</string>
162 </property>
163 <property name="toolTip">
164 <string>清空</string>
165 </property>
166 </action>
167 <action name="m_actExit">
168 <property name="icon">
169 <iconset resource="TcpServer.qrc">
170 <normaloff>:/images/exit.bmp</normaloff>:/images/exit.bmp</iconset>

```

```

171     </property>
172     <property name="text">
173         <string>退出</string>
174     </property>
175     <property name="toolTip">
176         <string>退出</string>
177     </property>
178 </action>
179 </widget>
180 <resources>
181     <include location="TcpServer.qrc"/>
182 </resources>
183 <connections>
184     <connection>
185         <sender>m_actExit</sender>
186         <signal>triggered</signal>
187         <receiver>TcpServerWindow</receiver>
188         <slot>close</slot>
189         <hints>
190             <hint type="sourceLabel">
191                 <x>-1</x>
192                 <y>-1</y>
193             </hint>
194             <hint type="destinationLabel">
195                 <x>339</x>
196                 <y>279</y>
197             </hint>
198         </hints>
199     </connection>
200 </connections>
201 </ui>

```

#### 94.1.4 功能框架

C:\Users\Minwei\Projects\Qt\TcpServer\tcpserverwindow.h:

```

1  #ifndef TCPSERVERWINDOW_H
2  #define TCPSERVERWINDOW_H
3
4  #include <QMainWindow>
5  #include <QLabel>
6
7  QT_BEGIN_NAMESPACE
8  namespace Ui { class TcpServerWindow; }
9  QT_END_NAMESPACE
10
11 class TcpServerWindow : public QMainWindow
12 {
13     Q_OBJECT
14
15 public:
16     TcpServerWindow(QWidget *parent = nullptr);
17     ~TcpServerWindow();
18
19 private slots:

```

```

20     void on_m_actListen_triggered();
21     void on_m_actClose_triggered();
22     void on_m_actClear_triggered();
23
24     void on_m_btnSend_clicked();
25
26 private:
27     Ui::TcpServerWindow *ui;
28     QLabel* m_labListenState;
29     QLabel* m_labSocketState;
30     QLabel* m_labSocketError;
31 };
32
33 #endif // TCPSERVERWINDOW_H

```

C:\Users\Minwei\Projects\Qt\TcpServer\tcpserverwindow.cpp:

```

1  #include <QHostInfo>
2
3  #include "tcpserverwindow.h"
4  #include "ui_tcpserverwindow.h"
5
6  TcpServerWindow::TcpServerWindow(QWidget *parent)
7      : QMainWindow(parent)
8      , ui(new Ui::TcpServerWindow)
9      , m_labListenState(new QLabel("监听状态: 关闭"))
10     , m_labSocketState(new QLabel("套接字状态: "))
11     , m_labSocketError(new QLabel("套接字错误: "))
12 {
13     ui->setupUi(this);
14
15     for (QHostAddress address : QHostInfo::fromName(
16         QHostInfo::localHostName()).addresses())
17         if(address.protocol() == QAbstractSocket::IPv4Protocol)
18             ui->m_comboLocalAddr->addItem(address.toString());
19
20     m_labListenState->setMinimumWidth(196);
21     ui->m_statusBar->addWidget(m_labListenState);
22     m_labSocketState->setMinimumWidth(197);
23     ui->m_statusBar->addWidget(m_labSocketState);
24     m_labSocketError->setMinimumWidth(197);
25     ui->m_statusBar->addWidget(m_labSocketError);
26 }
27
28 TcpServerWindow::~TcpServerWindow()
29 {
30     delete ui;
31 }
32
33 void TcpServerWindow::on_m_actListen_triggered()
34 {
35 }
36
37 void TcpServerWindow::on_m_actClose_triggered()
38 {

```

```

39 }
40
41 void TcpServerWindow::on_m_actClear_triggered()
42 {
43 }
44
45 void TcpServerWindow::on_m_btnSend_clicked()
46 {
47 }

```

## 94.2 TcpClient

### 94.2.1 创建项目

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

### 94.2.2 添加资源

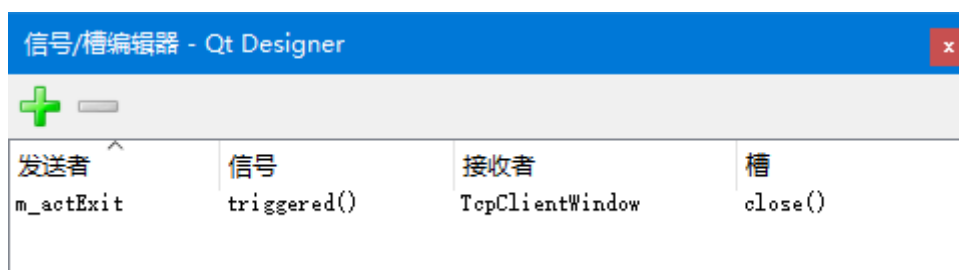
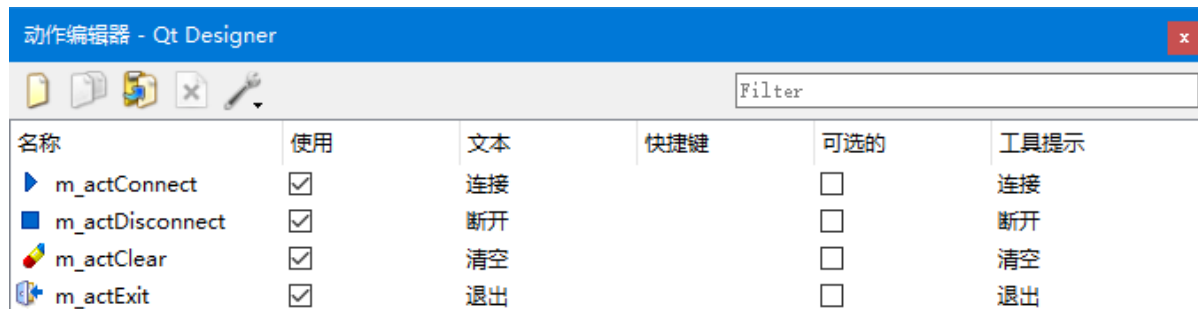
C:\Users\Minwei\Projects\Qt\TcpClient\TcpClient.qrc:

```

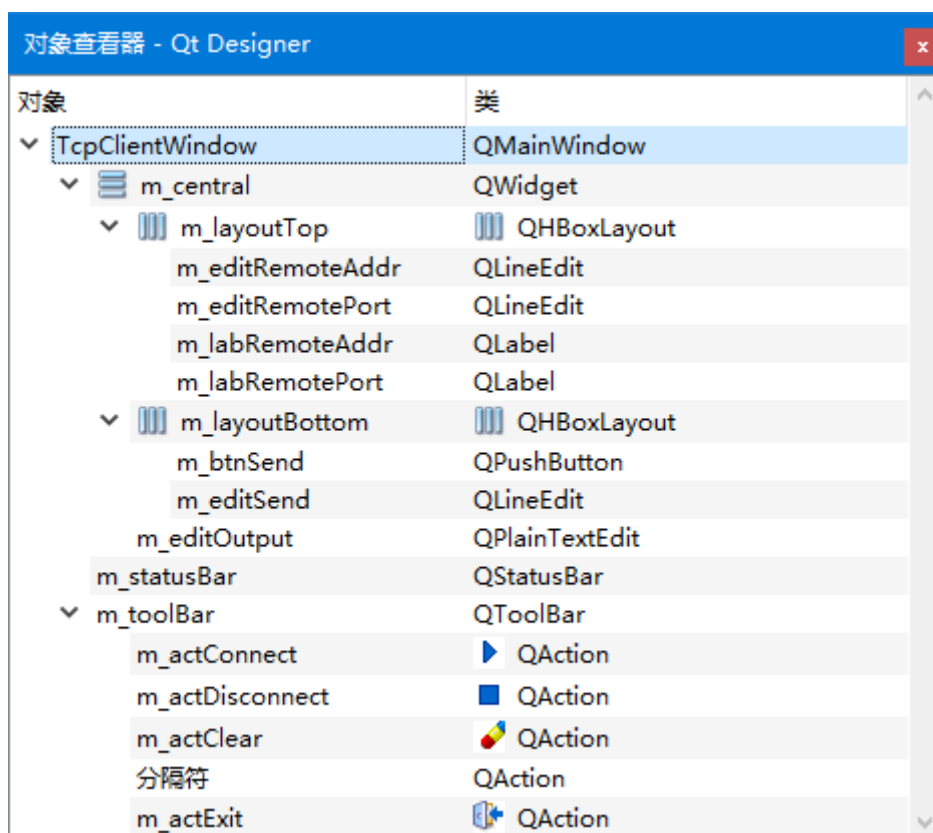
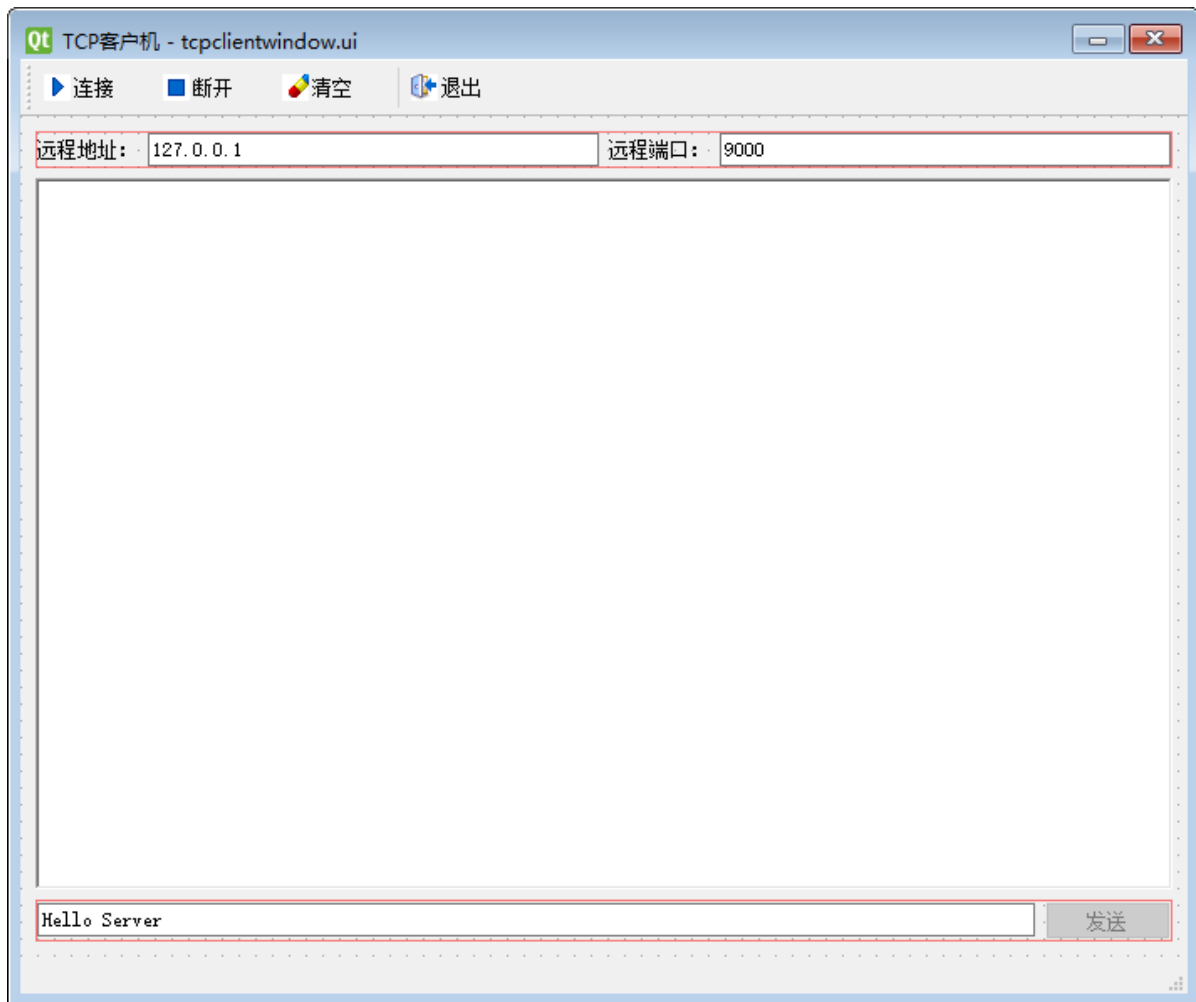
1 <RCC>
2   <qresource prefix="/">
3     <file>images/clear.bmp</file>
4     <file>images/connect.bmp</file>
5     <file>images/disconnect.bmp</file>
6     <file>images/exit.bmp</file>
7   </qresource>
8 </RCC>

```

### 94.2.3 设计界面







C:\Users\Minwei\Projects\Qt\TcpClient\tcpclientwindow.ui:

```

1 <?xml version="1.0" encoding="UTF-8"?>
2 <ui version="4.0">
3 <class>TcpClientWindow</class>

```

```
4 <widget class="QMainWindow" name="TcpClientwindow">
5   <property name="geometry">
6     <rect>
7       <x>0</x>
8       <y>0</y>
9       <width>696</width>
10      <height>557</height>
11    </rect>
12  </property>
13  <property name="windowTitle">
14    <string>TCP客户机</string>
15  </property>
16  <widget class="QWidget" name="m_central">
17    <layout class="QVBoxLayout" name="m_layoutVer">
18      <item>
19        <layout class="QHBoxLayout" name="m_layoutTop">
20          <item>
21            <widget class="QLabel" name="m_labRemoteAddr">
22              <property name="sizePolicy">
23                <sizepolicy hsizeType="Fixed" vsizeType="Preferred">
24                  <horstretch>0</horstretch>
25                  <verstretch>0</verstretch>
26                </sizepolicy>
27              </property>
28              <property name="text">
29                <string>远程地址: </string>
30              </property>
31            </widget>
32          </item>
33          <item>
34            <widget class="QLineEdit" name="m_editRemoteAddr">
35              <property name="sizePolicy">
36                <sizepolicy hsizeType="Preferred" vsizeType="Fixed">
37                  <horstretch>0</horstretch>
38                  <verstretch>0</verstretch>
39                </sizepolicy>
40              </property>
41              <property name="text">
42                <string>127.0.0.1</string>
43              </property>
44            </widget>
45          </item>
46          <item>
47            <widget class="QLabel" name="m_labRemotePort">
48              <property name="sizePolicy">
49                <sizepolicy hsizeType="Fixed" vsizeType="Preferred">
50                  <horstretch>0</horstretch>
51                  <verstretch>0</verstretch>
52                </sizepolicy>
53              </property>
54              <property name="text">
55                <string>远程端口: </string>
56              </property>
57            </widget>
58          </item>
59          <item>
```

```
60     <widget class="QLineEdit" name="m_editRemotePort">
61         <property name="sizePolicy">
62             <sizepolicy hsizeType="Preferred" vsizeType="Fixed">
63                 <horstretch>0</horstretch>
64                 <verstretch>0</verstretch>
65             </sizepolicy>
66         </property>
67         <property name="text">
68             <string>9000</string>
69         </property>
70     </widget>
71 </item>
72 </layout>
73 </item>
74 <item>
75     <widget class="QPlainTextEdit" name="m_editOutput">
76         <property name="frameShape">
77             <enum>QFrame::WinPanel</enum>
78         </property>
79         <property name="readOnly">
80             <bool>true</bool>
81         </property>
82     </widget>
83 </item>
84 <item>
85     <layout class="QHBoxLayout" name="m_layoutBottom">
86         <item>
87             <widget class="QLineEdit" name="m_editSend">
88                 <property name="text">
89                     <string>Hello Server</string>
90                 </property>
91             </widget>
92         </item>
93         <item>
94             <widget class="QPushButton" name="m_btnSend">
95                 <property name="enabled">
96                     <bool>false</bool>
97                 </property>
98                 <property name="text">
99                     <string>发送</string>
100                </property>
101                <property name="default">
102                    <bool>true</bool>
103                </property>
104            </widget>
105        </item>
106    </layout>
107 </item>
108 </layout>
109 </widget>
110 <widget class="QStatusBar" name="m_statusBar"/>
111 <widget class="QToolBar" name="m_toolBar">
112     <property name="windowTitle">
113         <string>toolBar</string>
114     </property>
115     <property name="toolButtonStyle">
```

```
116     <enum>Qt::ToolButtonTextBesideIcon</enum>
117 </property>
118 <attribute name="toolBarArea">
119     <enum>TopToolBarArea</enum>
120 </attribute>
121 <attribute name="toolBarBreak">
122     <bool>>false</bool>
123 </attribute>
124 <addaction name="m_actConnect"/>
125 <addaction name="m_actDisconnect"/>
126 <addaction name="m_actClear"/>
127 <addaction name="separator"/>
128 <addaction name="m_actExit"/>
129 </widget>
130 <action name="m_actConnect">
131     <property name="icon">
132         <iconset resource="TcpClient.qrc">
133
134             <normaloff>:/images/connect.bmp</normaloff>:/images/connect.bmp</iconset>
135             <property name="text">
136                 <string>连接</string>
137             </property>
138             <property name="toolTip">
139                 <string>连接</string>
140             </property>
141         </action>
142         <action name="m_actDisconnect">
143             <property name="icon">
144                 <iconset resource="TcpClient.qrc">
145
146                 <normaloff>:/images/disconnect.bmp</normaloff>:/images/disconnect.bmp</icon
147                 set>
148                 </property>
149                 <property name="text">
150                     <string>断开</string>
151                 </property>
152                 <property name="toolTip">
153                     <string>断开</string>
154                 </property>
155             </action>
156             <action name="m_actClear">
157                 <property name="icon">
158                     <iconset resource="TcpClient.qrc">
159                         <normaloff>:/images/clear.bmp</normaloff>:/images/clear.bmp</iconset>
160                     </property>
161                     <property name="text">
162                         <string>清空</string>
163                     </property>
164                     <property name="toolTip">
165                         <string>清空</string>
166                     </property>
167                 </action>
168                 <action name="m_actExit">
169                     <property name="icon">
170                         <iconset resource="TcpClient.qrc">
```

```

169     <normaloff>:/images/exit.bmp</normaloff>:/images/exit.bmp</iconset>
170 </property>
171 <property name="text">
172     <string>退出</string>
173 </property>
174 <property name="toolTip">
175     <string>退出</string>
176 </property>
177 </action>
178 </widget>
179 <resources>
180     <include location="TcpClient.qrc"/>
181 </resources>
182 <connections>
183     <connection>
184         <sender>m_actExit</sender>
185         <signal>triggered()</signal>
186         <receiver>TcpClientwindow</receiver>
187         <slot>close()</slot>
188         <hints>
189             <hint type="sourceLabel">
190                 <x>-1</x>
191                 <y>-1</y>
192             </hint>
193             <hint type="destinationLabel">
194                 <x>339</x>
195                 <y>279</y>
196             </hint>
197         </hints>
198     </connection>
199 </connections>
200 </ui>

```

## 94.2.4 功能框架

C:\Users\Minwei\Projects\Qt\TcpClient\tcpclientwindow.h:

```

1  #ifndef TCPCLIENTWINDOW_H
2  #define TCPCLIENTWINDOW_H
3
4  #include <QMainWindow>
5  #include <QLabel>
6
7  QT_BEGIN_NAMESPACE
8  namespace Ui { class TcpClientwindow; }
9  QT_END_NAMESPACE
10
11 class TcpClientwindow : public QMainWindow
12 {
13     Q_OBJECT
14
15 public:
16     TcpClientwindow(QWidget *parent = nullptr);
17     ~TcpClientwindow();
18

```

```

19 private slots:
20     void on_m_actConnect_triggered();
21     void on_m_actDisconnect_triggered();
22     void on_m_actClear_triggered();
23
24     void on_m_btnSend_clicked();
25
26 private:
27     Ui::TcpClientWindow *ui;
28     QLabel* m_labConnectionState;
29     QLabel* m_labSocketState;
30     QLabel* m_labSocketError;
31 };
32
33 #endif // TCPCLIENTWINDOW_H

```

C:\Users\Minwei\Projects\Qt\TcpClient\tcpclientwindow.cpp:

```

1  #include "tcpclientwindow.h"
2  #include "ui_tcpclientwindow.h"
3
4  TcpClientWindow::TcpClientWindow(QWidget *parent)
5      : QMainWindow(parent)
6      , ui(new Ui::TcpClientWindow)
7      , m_labConnectionState(new QLabel("连接状态: 断开"))
8      , m_labSocketState(new QLabel("套接字状态: "))
9      , m_labSocketError(new QLabel("套接字错误: "))
10 {
11     ui->setupUi(this);
12
13     m_labConnectionState->setMinimumWidth(196);
14     ui->m_statusBar->addWidget(m_labConnectionState);
15     m_labSocketState->setMinimumWidth(197);
16     ui->m_statusBar->addWidget(m_labSocketState);
17     m_labSocketError->setMinimumWidth(197);
18     ui->m_statusBar->addWidget(m_labSocketError);
19 }
20
21 TcpClientWindow::~TcpClientWindow()
22 {
23     delete ui;
24 }
25
26 void TcpClientWindow::on_m_actConnect_triggered()
27 {
28 }
29
30 void TcpClientWindow::on_m_actDisconnect_triggered()
31 {
32 }
33
34 void TcpClientWindow::on_m_actClear_triggered()
35 {
36 }
37

```

```
38 void TcpClientwindow::on_m_btnSend_clicked()
39 {
40 }
```