

Firefox 28.0+
Chrome 29.0+
Internet Explorer 11+
Opera 17.0+

Browsers not listed, including Safari, are supported via the styling under the

Old browsers comments below.

```
/
.hbox {
  / Old browsers /
  display: -webkit-box;
  -webkit-box-orient: horizontal;
  -webkit-box-align: stretch;
  display: -moz-box;
  -moz-box-orient: horizontal;
  -moz-box-align: stretch;
  display: box;
  box-orient: horizontal;
  box-align: stretch;
  / Modern browsers */
  display: flex;
  flex-direction: row;
  align-items: stretch;
}
.hbox > * {
  /* Old browsers /
  -webkit-box-flex: 0;
  -moz-box-flex: 0;
  box-flex: 0;
  / Modern browsers /
  flex: none;
}
.vbox {
  / Old browsers /
  display: -webkit-box;
  -webkit-box-orient: vertical;
  -webkit-box-align: stretch;
  display: -moz-box;
  -moz-box-orient: vertical;
  -moz-box-align: stretch;
  display: box;
  box-orient: vertical;
  box-align: stretch;
  / Modern browsers */
  display: flex;
  flex-direction: column;
  align-items: stretch;
}
.vbox > * {
  /* Old browsers /
  -webkit-box-flex: 0;
  -moz-box-flex: 0;
  box-flex: 0;
  / Modern browsers /
  flex: none;
}
.hbox.reverse,
.vbox.reverse,
.reverse {
  / Old browsers /
  -webkit-box-direction: reverse;
  -moz-box-direction: reverse;
  box-direction: reverse;
  / Modern browsers /
  flex-direction: row-reverse;
}
.hbox.box-flex0,
.vbox.box-flex0,
.box-flex0 {
  / Old browsers /
  -webkit-box-flex: 0;
  -moz-box-flex: 0;
  box-flex: 0;
  / Modern browsers /
  flex: none;
  width: auto;
}
.hbox.box-flex1,
.vbox.box-flex1,
.box-flex1 {
  / Old browsers /
  -webkit-box-flex: 1;
```

```

-moz-box-flex: 1;
box-flex: 1;
/ Modern browsers /
flex: 1;
}
.hbox.box-flex,
.vbox.box-flex,
.box-flex {
/ Old browsers /
/ Old browsers /
-webkit-box-flex: 1;
-moz-box-flex: 1;
box-flex: 1;
/ Modern browsers /
flex: 1;
}
.hbox.box-flex2,
.vbox.box-flex2,
.box-flex2 {
/ Old browsers /
-webkit-box-flex: 2;
-moz-box-flex: 2;
box-flex: 2;
/ Modern browsers /
flex: 2;
}
.box-group1 {
/ Deprecated /
-webkit-box-flex-group: 1;
-moz-box-flex-group: 1;
box-flex-group: 1;
}
.box-group2 {
/ Deprecated /
-webkit-box-flex-group: 2;
-moz-box-flex-group: 2;
box-flex-group: 2;
}
.hbox.start,
.vbox.start,
.start {
/ Old browsers /
-webkit-box-pack: start;
-moz-box-pack: start;
box-pack: start;
/ Modern browsers /
justify-content: flex-start;
}
.hbox.end,
.vbox.end,
.end {
/ Old browsers /
-webkit-box-pack: end;
-moz-box-pack: end;
box-pack: end;
/ Modern browsers /
justify-content: flex-end;
}
.hbox.center,
.vbox.center,
.center {
/ Old browsers /
-webkit-box-pack: center;
-moz-box-pack: center;
box-pack: center;
/ Modern browsers /
justify-content: center;
}
.hbox.baseline,
.vbox.baseline,
.baseline {
/ Old browsers /
-webkit-box-pack: baseline;
-moz-box-pack: baseline;
box-pack: baseline;
/ Modern browsers /
justify-content: baseline;
}
.hbox.stretch,
.vbox.stretch,
.stretch {
/ Old browsers /
-webkit-box-pack: stretch;
-moz-box-pack: stretch;
box-pack: stretch;
/ Modern browsers /
justify-content: stretch;
}

```

```

}
.hbox.align-start,
.vbox.align-start,
.align-start {
  / Old browsers /
  -webkit-box-align: start;
  -moz-box-align: start;
  box-align: start;
  / Modern browsers /
  align-items: flex-start;
}
.hbox.align-end,
.vbox.align-end,
.align-end {
  / Old browsers /
  -webkit-box-align: end;
  -moz-box-align: end;
  box-align: end;
  / Modern browsers /
  align-items: flex-end;
}
.hbox.align-center,
.vbox.align-center,
.align-center {
  / Old browsers /
  -webkit-box-align: center;
  -moz-box-align: center;
  box-align: center;
  / Modern browsers /
  align-items: center;
}
.hbox.align-baseline,
.vbox.align-baseline,
.align-baseline {
  / Old browsers /
  -webkit-box-align: baseline;
  -moz-box-align: baseline;
  box-align: baseline;
  / Modern browsers /
  align-items: baseline;
}
.hbox.align-stretch,
.vbox.align-stretch,
.align-stretch {
  / Old browsers /
  -webkit-box-align: stretch;
  -moz-box-align: stretch;
  box-align: stretch;
  / Modern browsers */
  align-items: stretch;
}
div.error {
  margin: 2em;
  text-align: center;
}
div.error > h1 {
  font-size: 500%;
  line-height: normal;
}
div.error > p {
  font-size: 200%;
  line-height: normal;
}
div.traceback-wrapper {
  text-align: left;
  max-width: 800px;
  margin: auto;
}
div.traceback-wrapper pre.traceback {
  max-height: 600px;
  overflow: auto;
}
/**

  • Primary styles
  *

  • Author: Jupyter Development Team
  /

  body {
    background-color: #fff;
    / This makes sure that the body covers the entire window and needs to
    be in a different element than the display: box in wrapper below /
    position: absolute;
    left: 0px;
    right: 0px;
    top: 0px;
    bottom: 0px;

```

```

    overflow: visible;
}
body > #header {
    / Initially hidden to prevent FLOUC /
    display: none;
    background-color: #fff;
    / Display over codemirror /
    position: relative;
    z-index: 100;
}
body > #header #header-container {
    display: flex;
    flex-direction: row;
    justify-content: space-between;
    padding: 5px;
    padding-bottom: 5px;
    padding-top: 5px;
    box-sizing: border-box;
    -moz-box-sizing: border-box;
    -webkit-box-sizing: border-box;
}
body > #header .header-bar {
    width: 100%;
    height: 1px;
    background: #e7e7e7;
    margin-bottom: -1px;
}
}
@media print {
    body > #header {
display: none !important;
    }
}
#header-spacer {
    width: 100%;
    visibility: hidden;
}
}
@media print {
    #header-spacer {
display: none;
    }
}
}
#ipython_notebook {
    padding-left: 0px;
    padding-top: 1px;
    padding-bottom: 1px;
}
[dir="rtl"] #ipython_notebook {
    margin-right: 10px;
    margin-left: 0;
}
}
[dir="rtl"] #ipython_notebook.pull-left {
    float: right !important;
    float: right;
}
}
.flex-spacer {
    flex: 1;
}
}
#noscript {
    width: auto;
    padding-top: 16px;
    padding-bottom: 16px;
    text-align: center;
    font-size: 22px;
    color: red;
    font-weight: bold;
}
}
#ipython_notebook img {
    height: 28px;
}
}
#site {
    width: 100%;
    display: none;
    box-sizing: border-box;
    -moz-box-sizing: border-box;
    -webkit-box-sizing: border-box;
    overflow: auto;
}
}
@media print {
    #site {
height: auto !important;
    }
}
}
/ Smaller buttons /
.ui-button .ui-button-text {
    padding: 0.2em 0.8em;
    font-size: 77%;
}
}

```

```

input.ui-button {
  padding: 0.3em 0.9em;
}
span#kernel_logo_widget {
  margin: 0 10px;
}
span#login_widget {
  float: right;
}
[dir="rtl"] span#login_widget {
  float: left;
}
span#login_widget > .button,
#logout {
  color: #333;
  background-color: #fff;
  border-color: #ccc;
}
span#login_widget > .button:focus,
#logout:focus,
span#login_widget > .button:focus,
#logout:focus {
  color: #333;
  background-color: #e6e6e6;
  border-color: #8c8c8c;
}
span#login_widget > .button:hover,
#logout:hover {
  color: #333;
  background-color: #e6e6e6;
  border-color: #adadad;
}
span#login_widget > .button:active,
#logout:active,
span#login_widget > .button:active,
#logout:active,
.open > .dropdown-toggle span#login_widget > .button,
.open > .dropdown-toggle #logout {
  color: #333;
  background-color: #e6e6e6;
  border-color: #adadad;
}
span#login_widget > .button:active:hover,
#logout:active:hover,
span#login_widget > .button:active:hover,
#logout:active:hover,
.open > .dropdown-toggle span#login_widget > .button:active:hover,
.open > .dropdown-toggle #logout:active:hover,
span#login_widget > .button:active:focus,
#logout:active:focus,
span#login_widget > .button:active:focus,
#logout:active:focus,
.open > .dropdown-toggle span#login_widget > .button:active:focus,
.open > .dropdown-toggle #logout:active:focus,
span#login_widget > .button:active:focus,
#logout:active:focus,
span#login_widget > .button:active:focus,
#logout:active:focus,
.open > .dropdown-toggle span#login_widget > .button:active:focus,
.open > .dropdown-toggle #logout:active:focus {
  color: #333;
  background-color: #d4d4d4;
  border-color: #8c8c8c;
}
span#login_widget > .button:active,
#logout:active,
span#login_widget > .button:active,
#logout:active,
.open > .dropdown-toggle span#login_widget > .button,
.open > .dropdown-toggle #logout {
  background-image: none;
}
span#login_widget > .button.disabled:hover,
#logout.disabled:hover,
span#login_widget > .button[disabled]:hover,
#logout[disabled]:hover,
fieldset[disabled] span#login_widget > .button:hover,
fieldset[disabled] #logout:hover,
span#login_widget > .button.disabled:focus,
#logout.disabled:focus,
span#login_widget > .button[disabled]:focus,
#logout[disabled]:focus,
fieldset[disabled] span#login_widget > .button:focus,
fieldset[disabled] #logout:focus,
span#login_widget > .button.disabled:focus,
#logout.disabled:focus,
span#login_widget > .button[disabled]:focus,
#logout[disabled]:focus,

```

```

#logout[disabled].focus,
fieldset[disabled] span#login_widget > .button.focus,
fieldset[disabled] #logout.focus {
    background-color: #fff;
    border-color: #ccc;
}
span#login_widget > .button .badge,
#logout .badge {
    color: #fff;
    background-color: #333;
}
.nav-header {
    text-transform: none;
}
#header > span {
    margin-top: 10px;
}
.modal_stretch .modal-dialog {
    / Old browsers /
    display: -webkit-box;
    -webkit-box-orient: vertical;
    -webkit-box-align: stretch;
    display: -moz-box;
    -moz-box-orient: vertical;
    -moz-box-align: stretch;
    display: box;
    box-orient: vertical;
    box-align: stretch;
    / Modern browsers /
    display: flex;
    flex-direction: column;
    align-items: stretch;
    min-height: 80vh;
}
.modal_stretch .modal-dialog .modal-body {
    max-height: calc(100vh - 200px);
    overflow: auto;
    flex: 1;
}
.modal-header {
    cursor: move;
}
@media (min-width: 768px) {
    .modal .modal-dialog {
        width: 700px;
    }
}
@media (min-width: 768px) {
    select.form-control {
        margin-left: 12px;
        margin-right: 12px;
    }
}
/
*

```

- IPython auth

```

*
/
.center-nav {
    display: inline-block;
    margin-bottom: -4px;
}
[dir="rtl"] .center-nav form.pull-left {
    float: right !important;
    float: right;
}
[dir="rtl"] .center-nav .navbar-text {
    float: right;
}
[dir="rtl"] .navbar-inner {
    text-align: right;
}
[dir="rtl"] div.text-left {
    text-align: right;
}
/
*

```

- IPython tree view

```

*
/
/ We need an invisible input field on top of the sentence/
/ "Drag file onto the list ..." */
.alternate_upload {
    background-color: none;
    display: inline;
}
.alternate_upload.form {

```

```

padding: 0;
margin: 0;
}
.alternate_upload input.fileinput {
position: absolute;
display: block;
width: 100%;
height: 100%;
overflow: hidden;
cursor: pointer;
opacity: 0;
z-index: 2;
}
.alternate_upload .btn-xs > input.fileinput {
margin: -1px -5px;
}
.alternate_upload .btn-upload {
position: relative;
height: 22px;
}
::-webkit-file-upload-button {
cursor: pointer;
}
/**
• Primary styles
*
• Author: Jupyter Development Team
/
ul##tabs {
margin-bottom: 4px;
}
ul##tabs a {
padding-top: 6px;
padding-bottom: 4px;
}
[dir="rtl"] ul##tabs.nav-tabs > li {
float: right;
}
[dir="rtl"] ul##tabs.nav.nav-tabs {
padding-right: 0;
}
ul.breadcrumb a:focus,
ul.breadcrumb a:hover {
text-decoration: none;
}
ul.breadcrumb i.icon-home {
font-size: 16px;
margin-right: 4px;
}
ul.breadcrumb span {
color: #5e5e5e;
}
.list_toolbar {
padding: 4px 0 4px 0;
vertical-align: middle;
}
.list_toolbar .tree-buttons {
padding-top: 1px;
}
[dir="rtl"] .list_toolbar .tree-buttons .pull-right {
float: left !important;
float: left;
}
[dir="rtl"] .list_toolbar .col-sm-4,
[dir="rtl"] .list_toolbar .col-sm-8 {
float: right;
}
.dynamic-buttons {
padding-top: 3px;
display: inline-block;
}
.list_toolbar [class="span"] {
min-height: 24px;
}
.list_header {
font-weight: bold;
background-color: #EEE;
}
.list_placeholder {
font-weight: bold;
padding-top: 4px;
padding-bottom: 4px;
padding-left: 7px;
padding-right: 7px;
}
.list_container {
margin-top: 4px;

```

```

margin-bottom: 20px;
border: 1px solid #ddd;
border-radius: 2px;
}
.list_container > div {
border-bottom: 1px solid #ddd;
}
.list_container > div:hover .list-item {
background-color: red;
}
.list_container > div:last-child {
border: none;
}
.list_item:hover .list_item {
background-color: #ddd;
}
.list_item a {
text-decoration: none;
}
.list_item:hover {
background-color: #fafafa;
}
.list_header > div,
.list_item > div {
padding-top: 4px;
padding-bottom: 4px;
padding-left: 7px;
padding-right: 7px;
line-height: 22px;
}
.list_header > div input,
.list_item > div input {
margin-right: 7px;
margin-left: 14px;
vertical-align: text-bottom;
line-height: 22px;
position: relative;
top: -1px;
}
.list_header > div .item_link,
.list_item > div .item_link {
margin-left: -1px;
vertical-align: baseline;
line-height: 22px;
}
[dir="rtl"] .list_item > div input {
margin-right: 0;
}
.new-file input[type=checkbox] {
visibility: hidden;
}
.item_name {
line-height: 22px;
height: 24px;
}
.item_icon {
font-size: 14px;
color: #5e5e5e;
margin-right: 7px;
margin-left: 7px;
line-height: 22px;
vertical-align: baseline;
}
.item_modified {
margin-right: 7px;
margin-left: 7px;
}
[dir="rtl"] .item_modified.pull-right {
float: left !important;
float: left;
}
.item_buttons {
line-height: 1em;
margin-left: -5px;
}
.item_buttons .btn,
.item_buttons .btn-group,
.item_buttons .input-group {
float: left;
}
.item_buttons > .btn,
.item_buttons > .btn-group,
.item_buttons > .input-group {
margin-left: 5px;
}
.item_buttons .btn {
min-width: 13ex;

```



```

}
.item_buttons .running-indicator {
padding-top: 4px;
color: #5cb85c;
}
.item_buttons .kernel-name {
padding-top: 4px;
color: #5bc0de;
margin-right: 7px;
float: left;
}
[dir="rtl"] .item_buttons.pull-right {
float: left !important;
float: left;
}
[dir="rtl"] .item_buttons .kernel-name {
margin-left: 7px;
float: right;
}
.toolbar_info {
height: 24px;
line-height: 24px;
}
.list_item input:not([type=checkbox]) {
padding-top: 3px;
padding-bottom: 3px;
height: 22px;
line-height: 14px;
margin: 0px;
}
.highlight_text {
color: blue;
}
#project_name {
display: inline-block;
padding-left: 7px;
margin-left: -2px;
}
#project_name > .breadcrumb {
padding: 0px;
margin-bottom: 0px;
background-color: transparent;
font-weight: bold;
}
.sort_button {
display: inline-block;
padding-left: 7px;
}
[dir="rtl"] .sort_button.pull-right {
float: left !important;
float: left;
}
#tree-selector {
padding-right: 0px;
}
#button-select-all {
min-width: 50px;
}
[dir="rtl"] #button-select-all.btn {
float: right ;
}
#select-all {
margin-left: 7px;
margin-right: 2px;
margin-top: 2px;
height: 16px;
}
[dir="rtl"] #select-all.pull-left {
float: right !important;
float: right;
}
.menu_icon {
margin-right: 2px;
}
.tab-content .row {
margin-left: 0px;
margin-right: 0px;
}
.folder_icon:before {
display: inline-block;
font: normal normal normal 14px/1 FontAwesome;
font-size: inherit;
text-rendering: auto;
-webkit-font-smoothing: antialiased;
-moz-osx-font-smoothing: grayscale;
content: "\f114";
}

```

```

.folder_icon:before.fa-pull-left {
  margin-right: .3em;
}
.folder_icon:before.fa-pull-right {
  margin-left: .3em;
}
.folder_icon:before.pull-left {
  margin-right: .3em;
}
.folder_icon:before.pull-right {
  margin-left: .3em;
}
.notebook_icon:before {
  display: inline-block;
  font: normal normal normal 14px/1 FontAwesome;
  font-size: inherit;
  text-rendering: auto;
  -webkit-font-smoothing: antialiased;
  -moz-osx-font-smoothing: grayscale;
  content: "\f02d";
  position: relative;
  top: -1px;
}
.notebook_icon:before.fa-pull-left {
  margin-right: .3em;
}
.notebook_icon:before.fa-pull-right {
  margin-left: .3em;
}
.notebook_icon:before.pull-left {
  margin-right: .3em;
}
.notebook_icon:before.pull-right {
  margin-left: .3em;
}
.running_notebook_icon:before {
  display: inline-block;
  font: normal normal normal 14px/1 FontAwesome;
  font-size: inherit;
  text-rendering: auto;
  -webkit-font-smoothing: antialiased;
  -moz-osx-font-smoothing: grayscale;
  content: "\f02d";
  position: relative;
  top: -1px;
  color: #5cb85c;
}
.running_notebook_icon:before.fa-pull-left {
  margin-right: .3em;
}
.running_notebook_icon:before.fa-pull-right {
  margin-left: .3em;
}
.running_notebook_icon:before.pull-left {
  margin-right: .3em;
}
.running_notebook_icon:before.pull-right {
  margin-left: .3em;
}
.file_icon:before {
  display: inline-block;
  font: normal normal normal 14px/1 FontAwesome;
  font-size: inherit;
  text-rendering: auto;
  -webkit-font-smoothing: antialiased;
  -moz-osx-font-smoothing: grayscale;
  content: "\f016";
  position: relative;
  top: -2px;
}
.file_icon:before.fa-pull-left {
  margin-right: .3em;
}
.file_icon:before.fa-pull-right {
  margin-left: .3em;
}
.file_icon:before.pull-left {
  margin-right: .3em;
}
.file_icon:before.pull-right {
  margin-left: .3em;
}
#notebook_toolbar .pull-right {
  padding-top: 0px;
  margin-right: -1px;
}
ul#new-menu {

```

```

left: auto;
right: 0;
}
#new-menu .dropdown-header {
font-size: 10px;
border-bottom: 1px solid #e5e5e5;
padding: 0 0 3px;
margin: -3px 20px 0;
}
.kernel-menu-icon {
padding-right: 12px;
width: 24px;
content: "\f096";
}
.kernel-menu-icon:before {
content: "\f096";
}
.kernel-menu-icon-current:before {
content: "\f00c";
}
}
#tab_content {
padding-top: 20px;
}
#running .panel-group .panel {
margin-top: 3px;
margin-bottom: 1em;
}
#running .panel-group .panel .panel-heading {
background-color: #EEE;
padding-top: 4px;
padding-bottom: 4px;
padding-left: 7px;
padding-right: 7px;
line-height: 22px;
}
#running .panel-group .panel .panel-heading a:focus,
#running .panel-group .panel .panel-heading a:hover {
text-decoration: none;
}
#running .panel-group .panel .panel-body {
padding: 0px;
}
#running .panel-group .panel .panel-body .list_container {
margin-top: 0px;
margin-bottom: 0px;
border: 0px;
border-radius: 0px;
}
#running .panel-group .panel .panel-body .list_container .list_item {
border-bottom: 1px solid #ddd;
}
#running .panel-group .panel .panel-body .list_container .list_item:last-child {
border-bottom: 0px;
}
.delete-button {
display: none;
}
.duplicate-button {
display: none;
}
.rename-button {
display: none;
}
.move-button {
display: none;
}
.download-button {
display: none;
}
.shutdown-button {
display: none;
}
.dynamic-instructions {
display: inline-block;
padding-top: 4px;
}
}
/*!
*
• IPython text editor webapp
*
/
.selected-keymap i.fa {
padding: 0px 5px;
}
.selected-keymap i.fa:before {
content: "\f00c";
}
}

```

```

#mode-menu {
overflow: auto;
max-height: 20em;
}
.edit_app #header {
-webkit-box-shadow: 0px 0px 12px 1px rgba(87, 87, 87, 0.2);
box-shadow: 0px 0px 12px 1px rgba(87, 87, 87, 0.2);
}
.edit_app #menubar .navbar {
/ Use a negative 1 bottom margin, so the border overlaps the border of the
header /
margin-bottom: -1px;
}
.dirty-indicator {
display: inline-block;
font: normal normal normal 14px/1 FontAwesome;
font-size: inherit;
text-rendering: auto;
-webkit-font-smoothing: antialiased;
-moz-osx-font-smoothing: grayscale;
width: 20px;
}
.dirty-indicator.fa-pull-left {
margin-right: .3em;
}
.dirty-indicator.fa-pull-right {
margin-left: .3em;
}
.dirty-indicator.pull-left {
margin-right: .3em;
}
.dirty-indicator.pull-right {
margin-left: .3em;
}
.dirty-indicator-dirty {
display: inline-block;
font: normal normal normal 14px/1 FontAwesome;
font-size: inherit;
text-rendering: auto;
-webkit-font-smoothing: antialiased;
-moz-osx-font-smoothing: grayscale;
width: 20px;
}
.dirty-indicator-dirty.fa-pull-left {
margin-right: .3em;
}
.dirty-indicator-dirty.fa-pull-right {
margin-left: .3em;
}
.dirty-indicator-dirty.pull-left {
margin-right: .3em;
}
.dirty-indicator-dirty.pull-right {
margin-left: .3em;
}
.dirty-indicator-clean {
display: inline-block;
font: normal normal normal 14px/1 FontAwesome;
font-size: inherit;
text-rendering: auto;
-webkit-font-smoothing: antialiased;
-moz-osx-font-smoothing: grayscale;
width: 20px;
}
.dirty-indicator-clean.fa-pull-left {
margin-right: .3em;
}
.dirty-indicator-clean.fa-pull-right {
margin-left: .3em;
}
.dirty-indicator-clean.pull-left {
margin-right: .3em;
}
.dirty-indicator-clean.pull-right {
margin-left: .3em;
}
.dirty-indicator-clean:before {
display: inline-block;
font: normal normal normal 14px/1 FontAwesome;
font-size: inherit;
text-rendering: auto;
-webkit-font-smoothing: antialiased;
-moz-osx-font-smoothing: grayscale;
content: "\f00c";
}
.dirty-indicator-clean:before.fa-pull-left {
margin-right: .3em;
}

```

```

}
.dirty-indicator-clean:before.fa-pull-right {
margin-left: .3em;
}
.dirty-indicator-clean:before.pull-left {
margin-right: .3em;
}
}
.dirty-indicator-clean:before.pull-right {
margin-left: .3em;
}
}
#filename {
font-size: 16pt;
display: table;
padding: 0px 5px;
}
#current-mode {
padding-left: 5px;
padding-right: 5px;
}
#texteditor-backdrop {
padding-top: 20px;
padding-bottom: 20px;
}
@media not print {
#texteditor-backdrop {
background-color: #EEE;
}
}
@media print {
#texteditor-backdrop #texteditor-container .CodeMirror-gutter,
#texteditor-backdrop #texteditor-container .CodeMirror-gutters {
background-color: #fff;
}
}
@media not print {
#texteditor-backdrop #texteditor-container .CodeMirror-gutter,
#texteditor-backdrop #texteditor-container .CodeMirror-gutters {
background-color: #fff;
}
}
}
@media not print {
#texteditor-backdrop #texteditor-container {
padding: 0px;
background-color: #fff;
-webkit-box-shadow: 0px 0px 12px 1px rgba(87, 87, 87, 0.2);
box-shadow: 0px 0px 12px 1px rgba(87, 87, 87, 0.2);
}
}
.CodeMirror-dialog {
background-color: #fff;
}
!
*

```

- IPython notebook
 - *
 - /
 - / CSS font colors for translated ANSI escape sequences /
 - / The color values are a mix of
 - <http://www.xcolors.net/dl/baskerville-ivorylight> (<http://www.xcolors.net/dl/baskerville-ivorylight>) and
 - <http://www.xcolors.net/dl/euphrasia> (<http://www.xcolors.net/dl/euphrasia>) /

```

.ansi-black-fg {
color: #3E424D;
}
.ansi-black-bg {
background-color: #3E424D;
}
.ansi-black-intense-fg {
color: #282C36;
}
.ansi-black-intense-bg {
background-color: #282C36;
}
.ansi-red-fg {
color: #E75C58;
}
.ansi-red-bg {
background-color: #E75C58;
}
.ansi-red-intense-fg {
color: #B22B31;
}
.ansi-red-intense-bg {
background-color: #B22B31;
}
.ansi-green-fg {
color: #00A250;
}
}

```

```

.ansi-green-bg {
background-color: #00A250;
}
.ansi-green-intense-fg {
color: #007427;
}
.ansi-green-intense-bg {
background-color: #007427;
}
.ansi-yellow-fg {
color: #DDB62B;
}
.ansi-yellow-bg {
background-color: #DDB62B;
}
.ansi-yellow-intense-fg {
color: #B27D12;
}
.ansi-yellow-intense-bg {
background-color: #B27D12;
}
.ansi-blue-fg {
color: #208FFB;
}
.ansi-blue-bg {
background-color: #208FFB;
}
.ansi-blue-intense-fg {
color: #0065CA;
}
.ansi-blue-intense-bg {
background-color: #0065CA;
}
.ansi-magenta-fg {
color: #D160C4;
}
.ansi-magenta-bg {
background-color: #D160C4;
}
.ansi-magenta-intense-fg {
color: #A03196;
}
.ansi-magenta-intense-bg {
background-color: #A03196;
}
.ansi-cyan-fg {
color: #60C6C8;
}
.ansi-cyan-bg {
background-color: #60C6C8;
}
.ansi-cyan-intense-fg {
color: #258F8F;
}
.ansi-cyan-intense-bg {
background-color: #258F8F;
}
.ansi-white-fg {
color: #C5C1B4;
}
.ansi-white-bg {
background-color: #C5C1B4;
}
.ansi-white-intense-fg {
color: #A1A6B2;
}
.ansi-white-intense-bg {
background-color: #A1A6B2;
}
.ansi-default-inverse-fg {
color: #FFFFFF;
}
.ansi-default-inverse-bg {
background-color: #000000;
}
.ansi-bold {
font-weight: bold;
}
.ansi-underline {
text-decoration: underline;
}
/ The following styles are deprecated an will be removed in a future version /
.ansibold {
font-weight: bold;
}
.ansi-inverse {
outline: 0.5px dotted;
}

```

```

}
/ use dark versions for foreground, to improve visibility /
.ansiblack {
color: black;
}
.ansired {
color: darkred;
}
.ansigreen {
color: darkgreen;
}
.ansiyellow {
color: #c4a000;
}
.ansiblue {
color: darkblue;
}
.ansipurple {
color: darkviolet;
}
.ansicyan {
color: steelblue;
}
.ansigray {
color: gray;
}
/ and light for background, for the same reason /
.ansibgblack {
background-color: black;
}
.ansibgred {
background-color: red;
}
.ansibggreen {
background-color: green;
}
.ansibgyellow {
background-color: yellow;
}
.ansibgblue {
background-color: blue;
}
.ansibgpurple {
background-color: magenta;
}
.ansibgcyan {
background-color: cyan;
}
.ansibggray {
background-color: gray;
}
div.cell {
/ Old browsers /
display: -webkit-box;
-webkit-box-orient: vertical;
-webkit-box-align: stretch;
display: -moz-box;
-moz-box-orient: vertical;
-moz-box-align: stretch;
display: box;
box-orient: vertical;
box-align: stretch;
/ Modern browsers /
display: flex;
flex-direction: column;
align-items: stretch;
border-radius: 2px;
box-sizing: border-box;
-moz-box-sizing: border-box;
-webkit-box-sizing: border-box;
border-width: 1px;
border-style: solid;
border-color: transparent;
width: 100%;
padding: 5px;
/ This acts as a spacer between cells, that is outside the border /
margin: 0px;
outline: none;
position: relative;
overflow: visible;
}
div.cell:before {
position: absolute;
display: block;
top: -1px;
left: -1px;
width: 5px;

```

```

height: calc(100% + 2px);
content: "";
background: transparent;
}
div.cell.jupyter-soft-selected {
border-left-color: #E3F2FD;
border-left-width: 1px;
padding-left: 5px;
border-right-color: #E3F2FD;
border-right-width: 1px;
background: #E3F2FD;
}
@media print {
div.cell.jupyter-soft-selected {
border-color: transparent;
}
}
div.cell.selected,
div.cell.selected.jupyter-soft-selected {
border-color: #ababab;
}
div.cell.selected:before,
div.cell.selected.jupyter-soft-selected:before {
position: absolute;
display: block;
top: -1px;
left: -1px;
width: 5px;
height: calc(100% + 2px);
content: "";
background: #42A5F5;
}
@media print {
div.cell.selected,
div.cell.selected.jupyter-soft-selected {
border-color: transparent;
}
}
.edit_mode div.cell.selected {
border-color: #66BB6A;
}
.edit_mode div.cell.selected:before {
position: absolute;
display: block;
top: -1px;
left: -1px;
width: 5px;
height: calc(100% + 2px);
content: "";
background: #66BB6A;
}
@media print {
.edit_mode div.cell.selected {
border-color: transparent;
}
}
.prompt {
/ This needs to be wide enough for 3 digit prompt numbers: ln[100]: /
min-width: 14ex;
/ This padding is tuned to match the padding on the CodeMirror editor. /
padding: 0.4em;
margin: 0px;
font-family: monospace;
text-align: right;
/ This has to match that of the the CodeMirror class line-height below /
line-height: 1.21429em;
/ Don't highlight prompt number selection /
-webkit-touch-callout: none;
-webkit-user-select: none;
-khtml-user-select: none;
-moz-user-select: none;
-ms-user-select: none;
user-select: none;
/ Use default cursor /
cursor: default;
}
@media (max-width: 540px) {
.prompt {
text-align: left;
}
}
div.inner_cell {
min-width: 0;
/ Old browsers /
display: -webkit-box;
-webkit-box-orient: vertical;
-webkit-box-align: stretch;

```



```

display: -moz-box;
-moz-box-orient: vertical;
-moz-box-align: stretch;
display: box;
box-orient: vertical;
box-align: stretch;
/ Modern browsers /
display: flex;
flex-direction: column;
align-items: stretch;
/ Old browsers /
-webkit-box-flex: 1;
-moz-box-flex: 1;
box-flex: 1;
/ Modern browsers /
flex: 1;
}
/ input_area and input_prompt must match in top border and margin for alignment /
div.input_area {
border: 1px solid #cfcfcf;
border-radius: 2px;
background: #f7f7f7;
line-height: 1.21429em;
}
/ This is needed so that empty prompt areas can collapse to zero height when there
is no content in the output_subarea and the prompt. The main purpose of this is
to make sure that empty JavaScript output_subareas have no height. /
div.prompt:empty {
padding-top: 0;
padding-bottom: 0;
}
div.unrecognized_cell {
padding: 5px 5px 5px 0px;
/ Old browsers /
display: -webkit-box;
-webkit-box-orient: horizontal;
-webkit-box-align: stretch;
display: -moz-box;
-moz-box-orient: horizontal;
-moz-box-align: stretch;
display: box;
box-orient: horizontal;
box-align: stretch;
/ Modern browsers /
display: flex;
flex-direction: row;
align-items: stretch;
}
div.unrecognized_cell .inner_cell {
border-radius: 2px;
padding: 5px;
font-weight: bold;
color: red;
border: 1px solid #cfcfcf;
background: #eaeaea;
}
div.unrecognized_cell .inner_cell a {
color: inherit;
text-decoration: none;
}
div.unrecognized_cell .inner_cell a:hover {
color: inherit;
text-decoration: none;
}
}
@media (max-width: 540px) {
div.unrecognized_cell > div.prompt {
display: none;
}
}
div.code_cell {
/ avoid page breaking on code cells when printing /
}
@media print {
div.code_cell {
page-break-inside: avoid;
}
}
/ any special styling for code cells that are currently running goes here /
div.input {
page-break-inside: avoid;
/ Old browsers /
display: -webkit-box;
-webkit-box-orient: horizontal;
-webkit-box-align: stretch;
display: -moz-box;
-moz-box-orient: horizontal;
-moz-box-align: stretch;

```

```

display: box;
box-orient: horizontal;
box-align: stretch;
/ Modern browsers /
display: flex;
flex-direction: row;
align-items: stretch;
}
@media (max-width: 540px) {
div.input {
/ Old browsers /
display: -webkit-box;
-webkit-box-orient: vertical;
-webkit-box-align: stretch;
display: -moz-box;
-moz-box-orient: vertical;
-moz-box-align: stretch;
display: box;
box-orient: vertical;
box-align: stretch;
/ Modern browsers /
display: flex;
flex-direction: column;
align-items: stretch;
}
}
/ input_area and input_prompt must match in top border and margin for alignment /
div.input_prompt {
color: #303F9F;
border-top: 1px solid transparent;
}
div.input_area > div.highlight {
margin: 0.4em;
border: none;
padding: 0px;
background-color: transparent;
}
div.input_area > div.highlight > pre {
margin: 0px;
border: none;
padding: 0px;
background-color: transparent;
}
/ The following gets added to the if it is detected that the user has a
monospace font with inconsistent normal/bold/italic height. See
notebookmain.js. Such fonts will have keywords vertically offset with
respect to the rest of the text. The user should select a better font.
See: https://github.com/ipython/ipython/issues/1503 (https://github.com/ipython/ipython/issues/1503)
*
.CodeMirror span {
vertical-align: bottom;
}
/
.CodeMirror {
line-height: 1.21429em;
/ Changed from 1em to our global default /
font-size: 14px;
height: auto;
/ Changed to auto to autogrow /
background: none;
/ Changed from white to allow our bg to show through /
}
.CodeMirror-scroll {
/ The CodeMirror docs are a bit fuzzy on if overflow-y should be hidden or visible./
/ We have found that if it is visible, vertical scrollbars appear with font size changes./
overflow-y: hidden;
overflow-x: auto;
}
.CodeMirror-lines {
/ In CM2, this used to be 0.4em, but in CM3 it went to 4px. We need the em value because /
/ we have set a different line-height and want this to scale with that. /
/ Note that this should set vertical padding only, since CodeMirror assumes
that horizontal padding will be set on CodeMirror pre /
padding: 0.4em 0;
}
.CodeMirror-linenumber {
padding: 0 8px 0 4px;
}
.CodeMirror-gutters {
border-bottom-left-radius: 2px;
border-top-left-radius: 2px;
}
.CodeMirror pre {
/ In CM3 this went to 4px from 0 in CM2. This sets horizontal padding only,
use .CodeMirror-lines for vertical /
padding: 0 0.4em;
border: 0;

```

```

border-radius: 0;
}
.CodeMirror-cursor {
border-left: 1.4px solid black;
}
@media screen and (min-width: 2138px) and (max-width: 4319px) {
.CodeMirror-cursor {
border-left: 2px solid black;
}
}
@media screen and (min-width: 4320px) {
.CodeMirror-cursor {
border-left: 4px solid black;
}
}
/

```

Original style from softwaremaniacs.org (c) Ivan Sagalaev Maniac@SoftwareManiacs.Org (mailto:Maniac@SoftwareManiacs.Org)
Adapted from GitHub theme

```

/
.highlight-base {
color: #000;
}
.highlight-variable {
color: #000;
}
.highlight-variable-2 {
color: #1a1a1a;
}
.highlight-variable-3 {
color: #333333;
}
.highlight-string {
color: #BA2121;
}
.highlight-comment {
color: #408080;
font-style: italic;
}
.highlight-number {
color: #080;
}
.highlight-atom {
color: #88F;
}
.highlight-keyword {
color: #008000;
font-weight: bold;
}
.highlight-builtin {
color: #008000;
}
.highlight-error {
color: #f00;
}
.highlight-operator {
color: #AA22FF;
font-weight: bold;
}
.highlight-meta {
color: #AA22FF;
}
/ previously not defined, copying from default codemirror /
.highlight-def {
color: #00f;
}
.highlight-string-2 {
color: #f50;
}
.highlight-qualifier {
color: #555;
}
.highlight-bracket {
color: #997;
}
.highlight-tag {
color: #170;
}
.highlight-attribute {
color: #00c;
}
.highlight-header {
color: blue;
}
.highlight-quote {
color: #090;
}
}

```

```

.highlight-link {
  color: #00c;
}
/ apply the same style to codemirror /
.cm-s-ipynote span.cm-keyword {
  color: #008000;
  font-weight: bold;
}
.cm-s-ipynote span.cm-atom {
  color: #88F;
}
.cm-s-ipynote span.cm-number {
  color: #080;
}
.cm-s-ipynote span.cm-def {
  color: #00f;
}
.cm-s-ipynote span.cm-variable {
  color: #000;
}
.cm-s-ipynote span.cm-operator {
  color: #AA22FF;
  font-weight: bold;
}
.cm-s-ipynote span.cm-variable-2 {
  color: #1a1a1a;
}
.cm-s-ipynote span.cm-variable-3 {
  color: #333333;
}
.cm-s-ipynote span.cm-comment {
  color: #408080;
  font-style: italic;
}
.cm-s-ipynote span.cm-string {
  color: #BA2121;
}
.cm-s-ipynote span.cm-string-2 {
  color: #f50;
}
.cm-s-ipynote span.cm-meta {
  color: #AA22FF;
}
.cm-s-ipynote span.cm-qualifier {
  color: #555;
}
.cm-s-ipynote span.cm-builtin {
  color: #008000;
}
.cm-s-ipynote span.cm-bracket {
  color: #997;
}
.cm-s-ipynote span.cm-tag {
  color: #170;
}
.cm-s-ipynote span.cm-attribute {
  color: #00c;
}
.cm-s-ipynote span.cm-header {
  color: blue;
}
.cm-s-ipynote span.cm-quote {
  color: #090;
}
.cm-s-ipynote span.cm-link {
  color: #00c;
}
.cm-s-ipynote span.cm-error {
  color: #f00;
}
.cm-s-ipynote span.cm-tab {
  background:
    url(data:image/png;base64,iVBORw0KGgoAAAANSUhEUgAAADAAAAAMCAYAAAAkuj5RAAAAAXNSR0IArs4c6QAAAGFJREFUSMft1Ls
    RQFAQheHPowAKoACx3lgEKtaEHUjDjORSgWTH/ZOdnZOcM/sgk/kFFWY0qV8foQwS4MKBCS3qR6ixBjVEIOobYAtivseIE120FaowJPN7
    5GMu8j/LfMwNjh4HUpwq4LUAAAAASUVORK5CYII=);
  background-position: right;
  background-repeat: no-repeat;
}
div.output_wrapper {
  / this position must be relative to enable descendents to be absolute within it /
  position: relative;
  / Old browsers /
  display: -webkit-box;
  -webkit-box-orient: vertical;
  -webkit-box-align: stretch;
  display: -moz-box;
  -moz-box-orient: vertical;

```

```

-moz-box-align: stretch;
display: box;
box-orient: vertical;
box-align: stretch;
/ Modern browsers /
display: flex;
flex-direction: column;
align-items: stretch;
z-index: 1;
}
/ class for the output area when it should be height-limited /
div.output_scroll {
/ ideally, this would be max-height, but FF barfs all over that /
height: 24em;
/ FF needs this and the wrapper to specify full width, or it will shrinkwrap /
width: 100%;
overflow: auto;
border-radius: 2px;
-webkit-box-shadow: inset 0 2px 8px rgba(0, 0, 0, 0.8);
box-shadow: inset 0 2px 8px rgba(0, 0, 0, 0.8);
display: block;
}
/ output div while it is collapsed /
div.output_collapsed {
margin: 0px;
padding: 0px;
/ Old browsers /
display: -webkit-box;
-webkit-box-orient: vertical;
-webkit-box-align: stretch;
display: -moz-box;
-moz-box-orient: vertical;
-moz-box-align: stretch;
display: box;
box-orient: vertical;
box-align: stretch;
/ Modern browsers /
display: flex;
flex-direction: column;
align-items: stretch;
}
div.out_prompt_overlay {
height: 100%;
padding: 0px 0.4em;
position: absolute;
border-radius: 2px;
}
div.out_prompt_overlay:hover {
/ use inner shadow to get border that is computed the same on WebKit/FF /
-webkit-box-shadow: inset 0 0 1px #000;
box-shadow: inset 0 0 1px #000;
background: rgba(240, 240, 240, 0.5);
}
div.output_prompt {
color: #D84315;
}
/ This class is the outer container of all output sections. /
div.output_area {
padding: 0px;
page-break-inside: avoid;
/ Old browsers /
display: -webkit-box;
-webkit-box-orient: horizontal;
-webkit-box-align: stretch;
display: -moz-box;
-moz-box-orient: horizontal;
-moz-box-align: stretch;
display: box;
box-orient: horizontal;
box-align: stretch;
/ Modern browsers /
display: flex;
flex-direction: row;
align-items: stretch;
}
div.output_area .MathJax_Display {
text-align: left !important;
}
div.output_area .rendered_html table {
margin-left: 0;
margin-right: 0;
}
div.output_area .rendered_html img {
margin-left: 0;
margin-right: 0;
}
div.output_area img,

```

```

div.output_area svg {
    max-width: 100%;
    height: auto;
}
div.output_area img.unconfined,
div.output_area svg.unconfined {
    max-width: none;
}
div.output_area .mgllyph > img {
    max-width: none;
}
/ This is needed to protect the pre formatting from global settings such
as that of bootstrap /
.output {
/ Old browsers /
display: -webkit-box;
-webkit-box-orient: vertical;
-webkit-box-align: stretch;
display: -moz-box;
-moz-box-orient: vertical;
-moz-box-align: stretch;
display: box;
box-orient: vertical;
box-align: stretch;
/ Modern browsers /
display: flex;
flex-direction: column;
align-items: stretch;
}
@media (max-width: 540px) {
div.output_area {
/ Old browsers /
display: -webkit-box;
-webkit-box-orient: vertical;
-webkit-box-align: stretch;
display: -moz-box;
-moz-box-orient: vertical;
-moz-box-align: stretch;
display: box;
box-orient: vertical;
box-align: stretch;
/ Modern browsers /
display: flex;
flex-direction: column;
align-items: stretch;
}
}
div.output_area pre {
margin: 0;
padding: 1px 0 1px 0;
border: 0;
vertical-align: baseline;
color: black;
background-color: transparent;
border-radius: 0;
}
/ This class is for the output subarea inside the output_area and after
the prompt div. /
div.output_subarea {
overflow-x: auto;
padding: 0.4em;
/ Old browsers /
-webkit-box-flex: 1;
-moz-box-flex: 1;
box-flex: 1;
/ Modern browsers /
flex: 1;
max-width: calc(100% - 14ex);
}
div.output_scroll div.output_subarea {
overflow-x: visible;
}
/ The rest of the output_* classes are for special styling of the different
output types /
/ all text output has this class: /
div.output_text {
text-align: left;
color: #000;
/ This has to match that of the the CodeMirror class line-height below /
line-height: 1.21429em;
}
/ stdout/stderr are 'text' as well as 'stream', but execute_result/error are not streams /
div.output_stderr {
background: #fdd;
/ very light red background for stderr /
}
div.output_latex {

```

```

    text-align: left;
}
/ Empty output_javascript divs should have no height /
div.output_javascript.empty {
    padding: 0;
}
.js-error {
    color: darkred;
}
/ raw_input styles /
div.raw_input_container {
    line-height: 1.21429em;
    padding-top: 5px;
}
pre.raw_input_prompt {
    / nothing needed here. /
}
input.raw_input {
    font-family: monospace;
    font-size: inherit;
    color: inherit;
    width: auto;
    / make sure input baseline aligns with prompt /
    vertical-align: baseline;
    / padding + margin = 0.5em between prompt and cursor /
    padding: 0em 0.25em;
    margin: 0em 0.25em;
}
input.raw_input:focus {
    box-shadow: none;
}
p.p-space {
    margin-bottom: 10px;
}
div.output_unrecognized {
    padding: 5px;
    font-weight: bold;
    color: red;
}
div.output_unrecognized a {
    color: inherit;
    text-decoration: none;
}
div.output_unrecognized a:hover {
    color: inherit;
    text-decoration: none;
}
.rendered_html {
    color: #000;
    / any extras will just be numbers: */
}
.rendered_html em {
    font-style: italic;
}
.rendered_html strong {
    font-weight: bold;
}
.rendered_html u {
    text-decoration: underline;
}
.rendered_html :link {
    text-decoration: underline;
}
.rendered_html :visited {
    text-decoration: underline;
}
.rendered_html h1 {
    font-size: 185.7%;
    margin: 1.08em 0 0 0;
    font-weight: bold;
    line-height: 1.0;
}
.rendered_html h2 {
    font-size: 157.1%;
    margin: 1.27em 0 0 0;
    font-weight: bold;
    line-height: 1.0;
}
.rendered_html h3 {
    font-size: 128.6%;
    margin: 1.55em 0 0 0;
    font-weight: bold;
    line-height: 1.0;
}
.rendered_html h4 {
    font-size: 100%;
    margin: 2em 0 0 0;

```

```

font-weight: bold;
line-height: 1.0;
}
.rendered_html h5 {
font-size: 100%;
margin: 2em 0 0 0;
font-weight: bold;
line-height: 1.0;
font-style: italic;
}
.rendered_html h6 {
font-size: 100%;
margin: 2em 0 0 0;
font-weight: bold;
line-height: 1.0;
font-style: italic;
}
.rendered_html h1:first-child {
margin-top: 0.538em;
}
.rendered_html h2:first-child {
margin-top: 0.636em;
}
.rendered_html h3:first-child {
margin-top: 0.777em;
}
.rendered_html h4:first-child {
margin-top: 1em;
}
.rendered_html h5:first-child {
margin-top: 1em;
}
.rendered_html h6:first-child {
margin-top: 1em;
}
.rendered_html ul:not(.list-inline),
.rendered_html ol:not(.list-inline) {
padding-left: 2em;
}
.rendered_html ul {
list-style: disc;
}
.rendered_html ul ul {
list-style: square;
margin-top: 0;
}
.rendered_html ul ul ul {
list-style: circle;
}
.rendered_html ol {
list-style: decimal;
}
.rendered_html ol ol {
list-style: upper-alpha;
margin-top: 0;
}
.rendered_html ol ol ol {
list-style: lower-alpha;
}
.rendered_html ol ol ol ol {
list-style: lower-roman;
}
.rendered_html ol ol ol ol ol {
list-style: decimal;
}
.rendered_html * + ul {
margin-top: 1em;
}
.rendered_html * + ol {
margin-top: 1em;
}
.rendered_html hr {
color: black;
background-color: black;
}
.rendered_html pre {
margin: 1em 2em;
padding: 0px;
background-color: #fff;
}
.rendered_html code {
background-color: #eff0f1;
}
.rendered_html p code {
padding: 1px 5px;
}
.rendered_html pre code {

```



```

background-color: #fff;
}
.rendered_html pre,
.rendered_html code {
border: 0;
color: #000;
font-size: 100%;
}
.rendered_html blockquote {
margin: 1em 2em;
}
.rendered_html table {
margin-left: auto;
margin-right: auto;
border: none;
border-collapse: collapse;
border-spacing: 0;
color: black;
font-size: 12px;
table-layout: fixed;
}
.rendered_html thead {
border-bottom: 1px solid black;
vertical-align: bottom;
}
.rendered_html tr,
.rendered_html th,
.rendered_html td {
text-align: right;
vertical-align: middle;
padding: 0.5em 0.5em;
line-height: normal;
white-space: normal;
max-width: none;
border: none;
}
.rendered_html th {
font-weight: bold;
}
.rendered_html tbody tr:nth-child(odd) {
background: #f5f5f5;
}
.rendered_html tbody tr:hover {
background: rgba(66, 165, 245, 0.2);
}
.rendered_html * + table {
margin-top: 1em;
}
.rendered_html p {
text-align: left;
}
.rendered_html * + p {
margin-top: 1em;
}
.rendered_html img {
display: block;
margin-left: auto;
margin-right: auto;
}
.rendered_html * + img {
margin-top: 1em;
}
.rendered_html img,
.rendered_html svg {
max-width: 100%;
height: auto;
}
.rendered_html img.unconfined,
.rendered_html svg.unconfined {
max-width: none;
}
.rendered_html .alert {
margin-bottom: initial;
}
.rendered_html * + .alert {
margin-top: 1em;
}
[dir="rtl"] .rendered_html p {
text-align: right;
}
div.text_cell {
/* Old browsers /
display: -webkit-box;
-webkit-box-orient: horizontal;
-webkit-box-align: stretch;
display: -moz-box;
-moz-box-orient: horizontal;

```

```

-moz-box-align: stretch;
display: box;
box-orient: horizontal;
box-align: stretch;
/ Modern browsers /
display: flex;
flex-direction: row;
align-items: stretch;
}
@media (max-width: 540px) {
div.text_cell > div.prompt {
display: none;
}
}
div.text_cell_render {
/ font-family: "Helvetica Neue", Arial, Helvetica, Geneva, sans-serif;
outline: none;
resize: none;
width: inherit;
border-style: none;
padding: 0.5em 0.5em 0.5em 0.4em;
color: #000;
box-sizing: border-box;
-moz-box-sizing: border-box;
-webkit-box-sizing: border-box;
}
a.anchor-link:link {
text-decoration: none;
padding: 0px 20px;
visibility: hidden;
}
h1: hover .anchor-link,
h2: hover .anchor-link,
h3: hover .anchor-link,
h4: hover .anchor-link,
h5: hover .anchor-link,
h6: hover .anchor-link {
visibility: visible;
}
.text_cell.rendered .input_area {
display: none;
}
}
.text_cell.rendered .rendered_html {
overflow-x: auto;
overflow-y: hidden;
}
}
.text_cell.rendered .rendered_html tr,
.text_cell.rendered .rendered_html th,
.text_cell.rendered .rendered_html td {
max-width: none;
}
}
.text_cell.unrendered .text_cell_render {
display: none;
}
}
.text_cell .dropzone .input_area {
border: 2px dashed #bababa;
margin: -1px;
}
}
.cm-header-1,
.cm-header-2,
.cm-header-3,
.cm-header-4,
.cm-header-5,
.cm-header-6 {
font-weight: bold;
font-family: "Helvetica Neue", Helvetica, Arial, sans-serif;
}
.cm-header-1 {
font-size: 185.7%;
}
}
.cm-header-2 {
font-size: 157.1%;
}
}
.cm-header-3 {
font-size: 128.6%;
}
}
.cm-header-4 {
font-size: 110%;
}
}
.cm-header-5 {
font-size: 100%;
font-style: italic;
}
}
.cm-header-6 {
font-size: 100%;
font-style: italic;
}

```

```
}  
/  
*
```

- IPython notebook webapp

```
*  
/  
@media (max-width: 767px) {  
  .notebook_app {  
    padding-left: 0px;  
    padding-right: 0px;  
  }  
}  
#ipython-main-app {  
  box-sizing: border-box;  
  -moz-box-sizing: border-box;  
  -webkit-box-sizing: border-box;  
  height: 100%;  
}  
div#notebook_panel {  
  margin: 0px;  
  padding: 0px;  
  box-sizing: border-box;  
  -moz-box-sizing: border-box;  
  -webkit-box-sizing: border-box;  
  height: 100%;  
}  
div#notebook {  
  font-size: 14px;  
  line-height: 20px;  
  overflow-y: hidden;  
  overflow-x: auto;  
  width: 100%;  
  / This spaces the page away from the edge of the notebook area /  
  padding-top: 20px;  
  margin: 0px;  
  outline: none;  
  box-sizing: border-box;  
  -moz-box-sizing: border-box;  
  -webkit-box-sizing: border-box;  
  min-height: 100%;  
}  
@media not print {  
  #notebook-container {  
    padding: 15px;  
    background-color: #fff;  
    min-height: 0;  
    -webkit-box-shadow: 0px 0px 12px 1px rgba(87, 87, 87, 0.2);  
    box-shadow: 0px 0px 12px 1px rgba(87, 87, 87, 0.2);  
  }  
}  
@media print {  
  #notebook-container {  
    width: 100%;  
  }  
}  
div.ui-widget-content {  
  border: 1px solid #ababab;  
  outline: none;  
}  
pre.dialog {  
  background-color: #f7f7f7;  
  border: 1px solid #ddd;  
  border-radius: 2px;  
  padding: 0.4em;  
  padding-left: 2em;  
}  
p.dialog {  
  padding: 0.2em;  
}  
/ Word-wrap output correctly. This is the CSS3 spelling, though Firefox seems  
to not honor it correctly. Webkit browsers (Chrome, rekonq, Safari) do.  
/  
pre,  
code,  
kbd,  
samp {  
  white-space: pre-wrap;  
}  
#fonttest {  
  font-family: monospace;  
}  
p {  
  margin-bottom: 0;  
}  
.end_space {  
  min-height: 100px;
```

```

transition: height .2s ease;
}
.notebook_app > #header {
-webkit-box-shadow: 0px 0px 12px 1px rgba(87, 87, 87, 0.2);
box-shadow: 0px 0px 12px 1px rgba(87, 87, 87, 0.2);
}
@media not print {
.notebook_app {
background-color: #EEE;
}
}
kbd {
border-style: solid;
border-width: 1px;
box-shadow: none;
margin: 2px;
padding-left: 2px;
padding-right: 2px;
padding-top: 1px;
padding-bottom: 1px;
}
.jupyter-keybindings {
padding: 1px;
line-height: 24px;
border-bottom: 1px solid gray;
}
.jupyter-keybindings input {
margin: 0;
padding: 0;
border: none;
}
.jupyter-keybindings i {
padding: 6px;
}
.well code {
background-color: #ffffff;
border-color: #ababab;
border-width: 1px;
border-style: solid;
padding: 2px;
padding-top: 1px;
padding-bottom: 1px;
}
/ CSS for the cell toolbar /
.celltoolbar {
border: thin solid #CFCFCF;
border-bottom: none;
background: #EEE;
border-radius: 2px 2px 0px 0px;
width: 100%;
height: 29px;
padding-right: 4px;
/ Old browsers /
display: -webkit-box;
-webkit-box-orient: horizontal;
-webkit-box-align: stretch;
display: -moz-box;
-moz-box-orient: horizontal;
-moz-box-align: stretch;
display: box;
box-orient: horizontal;
box-align: stretch;
/ Modern browsers /
display: flex;
flex-direction: row;
align-items: stretch;
/ Old browsers /
-webkit-box-pack: end;
-moz-box-pack: end;
box-pack: end;
/ Modern browsers /
justify-content: flex-end;
display: -webkit-flex;
}
@media print {
.celltoolbar {
display: none;
}
}
.ctb_hideshow {
display: none;
vertical-align: bottom;
}
/ ctb_show is added to the ctb_hideshow div to show the cell toolbar.
Cell toolbars are only shown when the ctb_global_show class is also set.
*/
.ctb_global_show .ctb_show.ctb_hideshow {

```

```

display: block;
}
.ctb_global_show .ctb_show + .input_area,
.ctb_global_show .ctb_show + div.text_cell_input,
.ctb_global_show .ctb_show ~ div.text_cell_render {
border-top-right-radius: 0px;
border-top-left-radius: 0px;
}
.ctb_global_show .ctb_show ~ div.text_cell_render {
border: 1px solid #cfcfcf;
}
.celltoolbar {
font-size: 87%;
padding-top: 3px;
}
.celltoolbar select {
display: block;
width: 100%;
height: 32px;
padding: 6px 12px;
font-size: 13px;
line-height: 1.42857143;
color: #555555;
background-color: #fff;
background-image: none;
border: 1px solid #ccc;
border-radius: 2px;
-webkit-box-shadow: inset 0 1px 1px rgba(0, 0, 0, 0.075);
box-shadow: inset 0 1px 1px rgba(0, 0, 0, 0.075);
-webkit-transition: border-color ease-in-out .15s, box-shadow ease-in-out .15s;
-o-transition: border-color ease-in-out .15s, box-shadow ease-in-out .15s;
transition: border-color ease-in-out .15s, box-shadow ease-in-out .15s;
height: 30px;
padding: 5px 10px;
font-size: 12px;
line-height: 1.5;
border-radius: 1px;
width: inherit;
font-size: inherit;
height: 22px;
padding: 0px;
display: inline-block;
}
.celltoolbar select:focus {
border-color: #66afe9;
outline: 0;
-webkit-box-shadow: inset 0 1px 1px rgba(0,0,0,.075), 0 0 8px rgba(102, 175, 233, 0.6);
box-shadow: inset 0 1px 1px rgba(0,0,0,.075), 0 0 8px rgba(102, 175, 233, 0.6);
}
.celltoolbar select::-moz-placeholder {
color: #999;
opacity: 1;
}
.celltoolbar select:-ms-input-placeholder {
color: #999;
}
.celltoolbar select::-webkit-input-placeholder {
color: #999;
}
.celltoolbar select::-ms-expand {
border: 0;
background-color: transparent;
}
.celltoolbar select[disabled],
.celltoolbar select[readonly],
fieldset[disabled] .celltoolbar select {
background-color: #eeeeee;
opacity: 1;
}
.celltoolbar select[disabled],
fieldset[disabled] .celltoolbar select {
cursor: not-allowed;
}
textarea.celltoolbar select {
height: auto;
}
select.celltoolbar select {
height: 30px;
line-height: 30px;
}
textarea.celltoolbar select,
select[multiple].celltoolbar select {
height: auto;
}
.celltoolbar label {
margin-left: 5px;
margin-right: 5px;
}

```

```

}
.tags_button_container {
width: 100%;
display: flex;
}
.tag-container {
display: flex;
flex-direction: row;
flex-grow: 1;
overflow: hidden;
position: relative;
}
.tag-container > * {
margin: 0 4px;
}
.remove-tag-btn {
margin-left: 4px;
}
.tags-input {
display: flex;
}
.cell-tag:last-child:after {
content: "";
position: absolute;
right: 0;
width: 40px;
height: 100%;
/* Fade to background color of cell toolbar */
background: linear-gradient(to right, rgba(0, 0, 0, 0), #EEE);
}
.tags-input > * {
margin-left: 4px;
}
.cell-tag,
.tags-input input,
.tags-input button {
display: block;
width: 100%;
height: 32px;
padding: 6px 12px;
font-size: 13px;
line-height: 1.42857143;
color: #555555;
background-color: #fff;
background-image: none;
border: 1px solid #ccc;
border-radius: 2px;
-webkit-box-shadow: inset 0 1px 1px rgba(0, 0, 0, 0.075);
box-shadow: inset 0 1px 1px rgba(0, 0, 0, 0.075);
-webkit-transition: border-color ease-in-out .15s, box-shadow ease-in-out .15s;
-o-transition: border-color ease-in-out .15s, box-shadow ease-in-out .15s;
transition: border-color ease-in-out .15s, box-shadow ease-in-out .15s;
height: 30px;
padding: 5px 10px;
font-size: 12px;
line-height: 1.5;
border-radius: 1px;
box-shadow: none;
width: inherit;
font-size: inherit;
height: 22px;
line-height: 22px;
padding: 0px 4px;
display: inline-block;
}
.cell-tag:focus,
.tags-input input:focus,
.tags-input button:focus {
border-color: #66afe9;
outline: 0;
-webkit-box-shadow: inset 0 1px 1px rgba(0,0,0,.075), 0 0 8px rgba(102, 175, 233, 0.6);
box-shadow: inset 0 1px 1px rgba(0,0,0,.075), 0 0 8px rgba(102, 175, 233, 0.6);
}
.cell-tag::-moz-placeholder,
.tags-input input::-moz-placeholder,
.tags-input button::-moz-placeholder {
color: #999;
opacity: 1;
}
.cell-tag:-ms-input-placeholder,
.tags-input input:-ms-input-placeholder,
.tags-input button:-ms-input-placeholder {
color: #999;
}
.cell-tag::-webkit-input-placeholder,
.tags-input input::-webkit-input-placeholder,
.tags-input button::-webkit-input-placeholder {

```

```

color: #999;
}
.cell-tag::-ms-expand,
.tags-input input::-ms-expand,
.tags-input button::-ms-expand {
border: 0;
background-color: transparent;
}
.cell-tag[disabled],
.tags-input input[disabled],
.tags-input button[disabled],
.cell-tag[readonly],
.tags-input input[readonly],
.tags-input button[readonly],
fieldset[disabled] .cell-tag,
fieldset[disabled] .tags-input input,
fieldset[disabled] .tags-input button {
background-color: #eeeeee;
opacity: 1;
}
.cell-tag[disabled],
.tags-input input[disabled],
.tags-input button[disabled],
fieldset[disabled] .cell-tag,
fieldset[disabled] .tags-input input,
fieldset[disabled] .tags-input button {
cursor: not-allowed;
}
textarea.cell-tag,
textarea.tags-input input,
textarea.tags-input button {
height: auto;
}
select.cell-tag,
select.tags-input input,
select.tags-input button {
height: 30px;
line-height: 30px;
}
textarea.cell-tag,
textarea.tags-input input,
textarea.tags-input button,
select[multiple].cell-tag,
select[multiple].tags-input input,
select[multiple].tags-input button {
height: auto;
}
.cell-tag,
.tags-input button {
padding: 0px 4px;
}
.cell-tag {
background-color: #fff;
white-space: nowrap;
}
.tags-input input[type=text]:focus {
outline: none;
box-shadow: none;
border-color: #ccc;
}
.completions {
position: absolute;
z-index: 110;
overflow: hidden;
border: 1px solid #ababab;
border-radius: 2px;
-webkit-box-shadow: 0px 6px 10px -1px #adadad;
box-shadow: 0px 6px 10px -1px #adadad;
line-height: 1;
}
.completions select {
background: white;
outline: none;
border: none;
padding: 0px;
margin: 0px;
overflow: auto;
font-family: monospace;
font-size: 110%;
color: #000;
width: auto;
}
.completions select option.context {
color: #286090;
}
#kernel_logo_widget .current_kernel_logo {
display: none;
}

```

```

margin-top: -1px;
margin-bottom: -1px;
width: 32px;
height: 32px;
}
[dir="rtl"] #kernel_logo_widget {
float: left !important;
float: left;
}
.modal .modal-body .move-path {
display: flex;
flex-direction: row;
justify-content: space;
align-items: center;
}
.modal .modal-body .move-path .server-root {
padding-right: 20px;
}
.modal .modal-body .move-path .path-input {
flex: 1;
}
#menubar {
box-sizing: border-box;
-moz-box-sizing: border-box;
-webkit-box-sizing: border-box;
margin-top: 1px;
}
#menubar .navbar {
border-top: 1px;
border-radius: 0px 0px 2px 2px;
margin-bottom: 0px;
}
#menubar .navbar-toggle {
float: left;
padding-top: 7px;
padding-bottom: 7px;
border: none;
}
#menubar .navbar-collapse {
clear: left;
}
[dir="rtl"] #menubar .navbar-toggle {
float: right;
}
[dir="rtl"] #menubar .navbar-collapse {
clear: right;
}
[dir="rtl"] #menubar .navbar-nav {
float: right;
}
[dir="rtl"] #menubar .nav {
padding-right: 0px;
}
[dir="rtl"] #menubar .navbar-nav > li {
float: right;
}
[dir="rtl"] #menubar .navbar-right {
float: left !important;
}
[dir="rtl"] ul.dropdown-menu {
text-align: right;
left: auto;
}
[dir="rtl"] ul#new-menu.dropdown-menu {
right: auto;
left: 0;
}
.nav-wrapper {
border-bottom: 1px solid #e7e7e7;
}
i.menu-icon {
padding-top: 4px;
}
[dir="rtl"] i.menu-icon.pull-right {
float: left !important;
float: left;
}
ul#help_menu li a {
overflow: hidden;
padding-right: 2.2em;
}
ul#help_menu li i {
margin-right: -1.2em;
}
[dir="rtl"] ul#help_menu li a {
padding-left: 2.2em;
}
}

```



```

[dir="rtl"] ul#help_menu li a i {
margin-right: 0;
margin-left: -1.2em;
}
[dir="rtl"] ul#help_menu li a i.pull-right {
float: left !important;
float: left;
}
.dropdown-submenu {
position: relative;
}
.dropdown-submenu > .dropdown-menu {
top: 0;
left: 100%;
margin-top: -6px;
margin-left: -1px;
}
[dir="rtl"] .dropdown-submenu > .dropdown-menu {
right: 100%;
margin-right: -1px;
}
.dropdown-submenu:hover > .dropdown-menu {
display: block;
}
.dropdown-submenu > a:after {
display: inline-block;
font: normal normal normal 14px/1 FontAwesome;
font-size: inherit;
text-rendering: auto;
-webkit-font-smoothing: antialiased;
-moz-osx-font-smoothing: grayscale;
display: block;
content: "\f0da";
float: right;
color: #333333;
margin-top: 2px;
margin-right: -10px;
}
.dropdown-submenu > a:after.fa-pull-left {
margin-right: .3em;
}
.dropdown-submenu > a:after.fa-pull-right {
margin-left: .3em;
}
.dropdown-submenu > a:after.pull-left {
margin-right: .3em;
}
.dropdown-submenu > a:after.pull-right {
margin-left: .3em;
}
}
[dir="rtl"] .dropdown-submenu > a:after {
float: left;
content: "\f0d9";
margin-right: 0;
margin-left: -10px;
}
.dropdown-submenu:hover > a:after {
color: #262626;
}
.dropdown-submenu.pull-left {
float: none;
}
.dropdown-submenu.pull-left > .dropdown-menu {
left: -100%;
margin-left: 10px;
}
}
#notification_area {
float: right !important;
float: right;
z-index: 10;
}
[dir="rtl"] #notification_area {
float: left !important;
float: left;
}
}
.indicator_area {
float: right !important;
float: right;
color: #777;
margin-left: 5px;
margin-right: 5px;
width: 11px;
z-index: 10;
text-align: center;
width: auto;
}
[dir="rtl"] .indicator_area {

```

```

float: left !important;
float: left;
}
#kernel_indicator {
float: right !important;
float: right;
color: #777;
margin-left: 5px;
margin-right: 5px;
width: 11px;
z-index: 10;
text-align: center;
width: auto;
border-left: 1px solid;
}
#kernel_indicator .kernel_indicator_name {
padding-left: 5px;
padding-right: 5px;
}
[dir="rtl"] #kernel_indicator {
float: left !important;
float: left;
border-left: 0;
border-right: 1px solid;
}
#modal_indicator {
float: right !important;
float: right;
color: #777;
margin-left: 5px;
margin-right: 5px;
width: 11px;
z-index: 10;
text-align: center;
width: auto;
}
[dir="rtl"] #modal_indicator {
float: left !important;
float: left;
}
#readonly-indicator {
float: right !important;
float: right;
color: #777;
margin-left: 5px;
margin-right: 5px;
width: 11px;
z-index: 10;
text-align: center;
width: auto;
margin-top: 2px;
margin-bottom: 0px;
margin-left: 0px;
margin-right: 0px;
display: none;
}
.modal_indicator:before {
width: 1.28571429em;
text-align: center;
}
.edit_mode .modal_indicator:before {
display: inline-block;
font: normal normal normal 14px/1 FontAwesome;
font-size: inherit;
text-rendering: auto;
-webkit-font-smoothing: antialiased;
-moz-osx-font-smoothing: grayscale;
content: "\f040";
}
.edit_mode .modal_indicator:before.fa-pull-left {
margin-right: .3em;
}
.edit_mode .modal_indicator:before.fa-pull-right {
margin-left: .3em;
}
.edit_mode .modal_indicator:before.pull-left {
margin-right: .3em;
}
.edit_mode .modal_indicator:before.pull-right {
margin-left: .3em;
}
}
.command_mode .modal_indicator:before {
display: inline-block;
font: normal normal normal 14px/1 FontAwesome;
font-size: inherit;
text-rendering: auto;
-webkit-font-smoothing: antialiased;

```

```

-moz-osx-font-smoothing: grayscale;
content: '';
}
.command_mode .modal_indicator:before.fa-pull-left {
margin-right: .3em;
}
.command_mode .modal_indicator:before.fa-pull-right {
margin-left: .3em;
}
.command_mode .modal_indicator:before.pull-left {
margin-right: .3em;
}
.command_mode .modal_indicator:before.pull-right {
margin-left: .3em;
}
}
.kernel_idle_icon:before {
display: inline-block;
font: normal normal normal 14px/1 FontAwesome;
font-size: inherit;
text-rendering: auto;
-webkit-font-smoothing: antialiased;
-moz-osx-font-smoothing: grayscale;
content: "\f10c";
}
.kernel_idle_icon:before.fa-pull-left {
margin-right: .3em;
}
.kernel_idle_icon:before.fa-pull-right {
margin-left: .3em;
}
.kernel_idle_icon:before.pull-left {
margin-right: .3em;
}
.kernel_idle_icon:before.pull-right {
margin-left: .3em;
}
}
.kernel_busy_icon:before {
display: inline-block;
font: normal normal normal 14px/1 FontAwesome;
font-size: inherit;
text-rendering: auto;
-webkit-font-smoothing: antialiased;
-moz-osx-font-smoothing: grayscale;
content: "\f111";
}
.kernel_busy_icon:before.fa-pull-left {
margin-right: .3em;
}
.kernel_busy_icon:before.fa-pull-right {
margin-left: .3em;
}
.kernel_busy_icon:before.pull-left {
margin-right: .3em;
}
.kernel_busy_icon:before.pull-right {
margin-left: .3em;
}
}
.kernel_dead_icon:before {
display: inline-block;
font: normal normal normal 14px/1 FontAwesome;
font-size: inherit;
text-rendering: auto;
-webkit-font-smoothing: antialiased;
-moz-osx-font-smoothing: grayscale;
content: "\f1e2";
}
.kernel_dead_icon:before.fa-pull-left {
margin-right: .3em;
}
.kernel_dead_icon:before.fa-pull-right {
margin-left: .3em;
}
.kernel_dead_icon:before.pull-left {
margin-right: .3em;
}
.kernel_dead_icon:before.pull-right {
margin-left: .3em;
}
}
.kernel_disconnected_icon:before {
display: inline-block;
font: normal normal normal 14px/1 FontAwesome;
font-size: inherit;
text-rendering: auto;
-webkit-font-smoothing: antialiased;
-moz-osx-font-smoothing: grayscale;
content: "\f127";
}
}

```

```

.kernel_disconnected_icon:before.fa-pull-left {
margin-right: .3em;
}
.kernel_disconnected_icon:before.fa-pull-right {
margin-left: .3em;
}
.kernel_disconnected_icon:before.pull-left {
margin-right: .3em;
}
.kernel_disconnected_icon:before.pull-right {
margin-left: .3em;
}
.notification_widget {
color: #777;
z-index: 10;
background: rgba(240, 240, 240, 0.5);
margin-right: 4px;
color: #333;
background-color: #fff;
border-color: #ccc;
}
.notification_widget:focus,
.notification_widget:focus {
color: #333;
background-color: #e6e6e6;
border-color: #8c8c8c;
}
.notification_widget:hover {
color: #333;
background-color: #e6e6e6;
border-color: #adadad;
}
.notification_widget.active,
.notification_widget.active,
.open > .dropdown-toggle.notification_widget {
color: #333;
background-color: #e6e6e6;
border-color: #adadad;
}
.notification_widget.active:hover,
.notification_widget.active:hover,
.open > .dropdown-toggle.notification_widget:hover,
.notification_widget.active:focus,
.notification_widget.active:focus,
.open > .dropdown-toggle.notification_widget:focus,
.notification_widget.active.focus,
.notification_widget.active.focus,
.open > .dropdown-toggle.notification_widget.focus {
color: #333;
background-color: #d4d4d4;
border-color: #8c8c8c;
}
.notification_widget.active,
.notification_widget.active,
.open > .dropdown-toggle.notification_widget {
background-image: none;
}
.notification_widget.disabled:hover,
.notification_widget[disabled]:hover,
fieldset[disabled] .notification_widget:hover,
.notification_widget.disabled:focus,
.notification_widget[disabled]:focus,
fieldset[disabled] .notification_widget:focus,
.notification_widget.disabled.focus,
.notification_widget[disabled].focus,
fieldset[disabled] .notification_widget.focus {
background-color: #fff;
border-color: #ccc;
}
.notification_widget .badge {
color: #fff;
background-color: #333;
}
.notification_widget.warning {
color: #fff;
background-color: #f0ad4e;
border-color: #eea236;
}
.notification_widget.warning:focus,
.notification_widget.warning.focus {
color: #fff;
background-color: #ec971f;
border-color: #985f0d;
}
.notification_widget.warning:hover {
color: #fff;
background-color: #ec971f;
}

```

```

border-color: #d58512;
}
.notification_widget.warning.active,
.notification_widget.warning.active,
.open > .dropdown-toggle.notification_widget.warning {
color: #fff;
background-color: #ec971f;
border-color: #d58512;
}
.notification_widget.warning.active:hover,
.notification_widget.warning.active:hover,
.open > .dropdown-toggle.notification_widget.warning:hover,
.notification_widget.warning.active:focus,
.notification_widget.warning.active:focus,
.open > .dropdown-toggle.notification_widget.warning:focus,
.notification_widget.warning.active:focus,
.notification_widget.warning.active:focus,
.open > .dropdown-toggle.notification_widget.warning:focus {
color: #fff;
background-color: #d58512;
border-color: #985f0d;
}
.notification_widget.warning.active,
.notification_widget.warning.active,
.open > .dropdown-toggle.notification_widget.warning {
background-image: none;
}
.notification_widget.warning.disabled:hover,
.notification_widget.warning[disabled]:hover,
fieldset[disabled] .notification_widget.warning:hover,
.notification_widget.warning.disabled:focus,
.notification_widget.warning[disabled]:focus,
fieldset[disabled] .notification_widget.warning:focus,
.notification_widget.warning.disabled:focus,
.notification_widget.warning[disabled].focus,
fieldset[disabled] .notification_widget.warning.focus {
background-color: #f0ad4e;
border-color: #eea236;
}
.notification_widget.warning .badge {
color: #f0ad4e;
background-color: #fff;
}
.notification_widget.success {
color: #fff;
background-color: #5cb85c;
border-color: #4cae4c;
}
.notification_widget.success:focus,
.notification_widget.success.focus {
color: #fff;
background-color: #449d44;
border-color: #255625;
}
.notification_widget.success:hover {
color: #fff;
background-color: #449d44;
border-color: #398439;
}
.notification_widget.success.active,
.notification_widget.success.active,
.open > .dropdown-toggle.notification_widget.success {
color: #fff;
background-color: #449d44;
border-color: #398439;
}
.notification_widget.success.active:hover,
.notification_widget.success.active:hover,
.open > .dropdown-toggle.notification_widget.success:hover,
.notification_widget.success.active:focus,
.notification_widget.success.active:focus,
.open > .dropdown-toggle.notification_widget.success:focus,
.notification_widget.success.active:focus,
.notification_widget.success.active:focus,
.open > .dropdown-toggle.notification_widget.success.focus {
color: #fff;
background-color: #398439;
border-color: #255625;
}
.notification_widget.success.active,
.notification_widget.success.active,
.open > .dropdown-toggle.notification_widget.success {
background-image: none;
}
.notification_widget.success.disabled:hover,
.notification_widget.success[disabled]:hover,
fieldset[disabled] .notification_widget.success:hover,

```

```

.notification_widget.success.disabled:focus,
.notification_widget.success[disabled]:focus,
fieldset[disabled] .notification_widget.success:focus,
.notification_widget.success.disabled:focus,
.notification_widget.success[disabled]:focus,
fieldset[disabled] .notification_widget.success:focus {
background-color: #5cb85c;
border-color: #4cae4c;
}
.notification_widget.success .badge {
color: #5cb85c;
background-color: #fff;
}
.notification_widget.info {
color: #fff;
background-color: #5bc0de;
border-color: #46b8da;
}
.notification_widget.info:focus,
.notification_widget.info:focus {
color: #fff;
background-color: #31b0d5;
border-color: #1b6d85;
}
.notification_widget.info:hover {
color: #fff;
background-color: #31b0d5;
border-color: #269abc;
}
.notification_widget.info.active,
.notification_widget.info.active,
.open > .dropdown-toggle.notification_widget.info {
color: #fff;
background-color: #31b0d5;
border-color: #269abc;
}
.notification_widget.info.active:hover,
.notification_widget.info.active:hover,
.open > .dropdown-toggle.notification_widget.info:hover,
.notification_widget.info.active:focus,
.notification_widget.info.active:focus,
.open > .dropdown-toggle.notification_widget.info:focus,
.notification_widget.info.active:focus,
.notification_widget.info.active:focus,
.open > .dropdown-toggle.notification_widget.info:focus {
color: #fff;
background-color: #269abc;
border-color: #1b6d85;
}
.notification_widget.info.active,
.notification_widget.info.active,
.open > .dropdown-toggle.notification_widget.info {
background-image: none;
}
.notification_widget.info.disabled:hover,
.notification_widget.info[disabled]:hover,
fieldset[disabled] .notification_widget.info:hover,
.notification_widget.info.disabled:focus,
.notification_widget.info[disabled]:focus,
fieldset[disabled] .notification_widget.info:focus,
.notification_widget.info.disabled:focus,
.notification_widget.info[disabled].focus,
fieldset[disabled] .notification_widget.info.focus {
background-color: #5bc0de;
border-color: #46b8da;
}
.notification_widget.info .badge {
color: #5bc0de;
background-color: #fff;
}
.notification_widget.danger {
color: #fff;
background-color: #d9534f;
border-color: #d43f3a;
}
.notification_widget.danger:focus,
.notification_widget.danger:focus {
color: #fff;
background-color: #c9302c;
border-color: #761c19;
}
.notification_widget.danger:hover {
color: #fff;
background-color: #c9302c;
border-color: #ac2925;
}
.notification_widget.danger.active,

```

```

.notification_widget.danger.active,
.open > .dropdown-toggle.notification_widget.danger {
color: #fff;
background-color: #c9302c;
border-color: #ac2925;
}
.notification_widget.danger.active:hover,
.notification_widget.danger.active:active,
.open > .dropdown-toggle.notification_widget.danger:hover,
.notification_widget.danger.active:focus,
.notification_widget.danger.active:active:focus,
.open > .dropdown-toggle.notification_widget.danger:focus,
.notification_widget.danger.active:focus,
.notification_widget.danger.active:active:focus,
.open > .dropdown-toggle.notification_widget.danger:focus {
color: #fff;
background-color: #ac2925;
border-color: #761c19;
}
.notification_widget.danger.active,
.notification_widget.danger.active,
.open > .dropdown-toggle.notification_widget.danger {
background-image: none;
}
.notification_widget.danger.disabled:hover,
.notification_widget.danger[disabled]:hover,
fieldset[disabled] .notification_widget.danger:hover,
.notification_widget.danger.disabled:focus,
.notification_widget.danger[disabled]:focus,
fieldset[disabled] .notification_widget.danger:focus,
.notification_widget.danger.disabled:focus,
.notification_widget.danger[disabled].focus,
fieldset[disabled] .notification_widget.danger.focus {
background-color: #d9534f;
border-color: #d43f3a;
}
.notification_widget.danger .badge {
color: #d9534f;
background-color: #fff;
}
div#pager {
background-color: #fff;
font-size: 14px;
line-height: 20px;
overflow: hidden;
display: none;
position: fixed;
bottom: 0px;
width: 100%;
max-height: 50%;
padding-top: 8px;
-webkit-box-shadow: 0px 0px 12px 1px rgba(87, 87, 87, 0.2);
box-shadow: 0px 0px 12px 1px rgba(87, 87, 87, 0.2);
/* Display over codemirror /
z-index: 100;
/ Hack which prevents jquery ui resizable from changing top. /
top: auto !important;
}
div#pager pre {
line-height: 1.21429em;
color: #000;
background-color: #f7f7f7;
padding: 0.4em;
}
div#pager #pager-button-area {
position: absolute;
top: 8px;
right: 20px;
}
div#pager #pager-contents {
position: relative;
overflow: auto;
width: 100%;
height: 100%;
}
div#pager #pager-contents #pager-container {
position: relative;
padding: 15px 0px;
box-sizing: border-box;
-moz-box-sizing: border-box;
-webkit-box-sizing: border-box;
}
div#pager .ui-resizable-handle {
top: 0px;
height: 8px;
background: #f7f7f7;
border-top: 1px solid #cfcfcf;

```

```

border-bottom: 1px solid #cfcfcf;
/ This injects handle bars (a short, wide = symbol) for
the resize handle. /
}
div#pager .ui-resizable-handle::after {
content: "";
top: 2px;
left: 50%;
height: 3px;
width: 30px;
margin-left: -15px;
position: absolute;
border-top: 1px solid #cfcfcf;
}
.quickhelp {
/ Old browsers /
display: -webkit-box;
-webkit-box-orient: horizontal;
-webkit-box-align: stretch;
display: -moz-box;
-moz-box-orient: horizontal;
-moz-box-align: stretch;
display: box;
box-orient: horizontal;
box-align: stretch;
/ Modern browsers /
display: flex;
flex-direction: row;
align-items: stretch;
line-height: 1.8em;
}
.shortcut_key {
display: inline-block;
width: 21ex;
text-align: right;
font-family: monospace;
}
.shortcut_descr {
display: inline-block;
/ Old browsers /
-webkit-box-flex: 1;
-moz-box-flex: 1;
box-flex: 1;
/ Modern browsers */
flex: 1;
}
span.save_widget {
height: 30px;
margin-top: 4px;
display: flex;
justify-content: flex-start;
align-items: baseline;
width: 50%;
flex: 1;
}
span.save_widget span.filename {
height: 100%;
line-height: 1em;
margin-left: 16px;
border: none;
font-size: 146.5%;
text-overflow: ellipsis;
overflow: hidden;
white-space: nowrap;
border-radius: 2px;
}
span.save_widget span.filename:hover {
background-color: #e6e6e6;
}
[dir="rtl"] span.save_widget.pull-left {
float: right !important;
float: right;
}
[dir="rtl"] span.save_widget span.filename {
margin-left: 0;
margin-right: 16px;
}
span.checkpoint_status,
span.autosave_status {
font-size: small;
white-space: nowrap;
padding: 0 5px;
}
@media (max-width: 767px) {
span.save_widget {
font-size: small;
padding: 0 0 0 5px;
}

```



```

}
span.checkpoint_status,
span.autosave_status {
  display: none;
}
}
@media (min-width: 768px) and (max-width: 991px) {
span.checkpoint_status {
  display: none;
}
span.autosave_status {
  font-size: x-small;
}
}
.toolbar {
padding: 0px;
margin-left: -5px;
margin-top: 2px;
margin-bottom: 5px;
box-sizing: border-box;
-moz-box-sizing: border-box;
-webkit-box-sizing: border-box;
}
.toolbar select,
.toolbar label {
width: auto;
vertical-align: middle;
margin-right: 2px;
margin-bottom: 0px;
display: inline;
font-size: 92%;
margin-left: 0.3em;
margin-right: 0.3em;
padding: 0px;
padding-top: 3px;
}
.toolbar .btn {
padding: 2px 8px;
}
.toolbar .btn-group {
margin-top: 0px;
margin-left: 5px;
}
.toolbar .btn-label {
margin-left: 6px;
}
#maintoolbar {
margin-bottom: -3px;
margin-top: -8px;
border: 0px;
min-height: 27px;
margin-left: 0px;
padding-top: 11px;
padding-bottom: 3px;
}
#maintoolbar .navbar-text {
float: none;
vertical-align: middle;
text-align: right;
margin-left: 5px;
margin-right: 0px;
margin-top: 0px;
}
.select-xs {
height: 24px;
}
[dir="rtl"] .btn-group > .btn,
.btn-group-vertical > .btn {
float: right;
}
.pulse,
.dropdown-menu > li > a.pulse,
li.pulse > a.dropdown-toggle,
li.pulse.open > a.dropdown-toggle {
background-color: #F37626;
color: white;
}
/**
• Primary styles
*
• Author: Jupyter Development Team
*/
/** WARNING IF YOU ARE EDITTING THIS FILE, if this is a .css file, It has a lot
• of chance of beeing generated from the ../less/[samename].less file, you can
• try to get back the less file by reverting somme commit in history
*/
/

```

- We'll try to get something pretty, so we
- have some strange css to have the scroll bar on
- the left with fix button on the top right of the tooltip

```

/
@-moz-keyframes fadeOut {
  from {
    opacity: 1;
  }
  to {
    opacity: 0;
  }
}
@-webkit-keyframes fadeOut {
  from {
    opacity: 1;
  }
  to {
    opacity: 0;
  }
}
@-moz-keyframes fadeIn {
  from {
    opacity: 0;
  }
  to {
    opacity: 1;
  }
}
@-webkit-keyframes fadeIn {
  from {
    opacity: 0;
  }
  to {
    opacity: 1;
  }
}
/properties of tooltip after "expand"/
.bigtooltip {
  overflow: auto;
  height: 200px;
  -webkit-transition-property: height;
  -webkit-transition-duration: 500ms;
  -moz-transition-property: height;
  -moz-transition-duration: 500ms;
  transition-property: height;
  transition-duration: 500ms;
}
/properties of tooltip before "expand"/
.smalltooltip {
  -webkit-transition-property: height;
  -webkit-transition-duration: 500ms;
  -moz-transition-property: height;
  -moz-transition-duration: 500ms;
  transition-property: height;
  transition-duration: 500ms;
  text-overflow: ellipsis;
  overflow: hidden;
  height: 80px;
}
.tooltipbuttons {
  position: absolute;
  padding-right: 15px;
  top: 0px;
  right: 0px;
}
.tooltiptext {
  /avoid the button to overlap on some docstring/
  padding-right: 30px;
}
.ipython_tooltip {
  max-width: 700px;
  /fade-in animation when inserted/
  -webkit-animation: fadeOut 400ms;
  -moz-animation: fadeOut 400ms;
  animation: fadeOut 400ms;
  -webkit-animation: fadeIn 400ms;
  -moz-animation: fadeIn 400ms;
  animation: fadeIn 400ms;
  vertical-align: middle;
  background-color: #f7f7f7;
  overflow: visible;
  border: #ababab 1px solid;
  outline: none;
  padding: 3px;
  margin: 0px;
  padding-left: 7px;
  font-family: monospace;

```

```

min-height: 50px;
-moz-box-shadow: 0px 6px 10px -1px #adadad;
-webkit-box-shadow: 0px 6px 10px -1px #adadad;
box-shadow: 0px 6px 10px -1px #adadad;
border-radius: 2px;
position: absolute;
z-index: 1000;
}
.ipython_tooltip a {
float: right;
}
.ipython_tooltip .tooltiptext pre {
border: 0;
border-radius: 0;
font-size: 100%;
background-color: #f7f7f7;
}
.pretooltiparrow {
left: 0px;
margin: 0px;
top: -16px;
width: 40px;
height: 16px;
overflow: hidden;
position: absolute;
}
.pretooltiparrow:before {
background-color: #f7f7f7;
border: 1px #ababab solid;
z-index: 11;
content: "";
position: absolute;
left: 15px;
top: 10px;
width: 25px;
height: 25px;
-webkit-transform: rotate(45deg);
-moz-transform: rotate(45deg);
-ms-transform: rotate(45deg);
-o-transform: rotate(45deg);
}
ul.typeahead-list i {
margin-left: -10px;
width: 18px;
}
[dir="rtl"] ul.typeahead-list i {
margin-left: 0;
margin-right: -10px;
}
ul.typeahead-list {
max-height: 80vh;
overflow: auto;
}
ul.typeahead-list > li > a {
/** Firefox bug **/
/ see https://github.com/jupyter/notebook/issues/559 (https://github.com/jupyter/notebook/issues/559) /
white-space: normal;
}
ul.typeahead-list > li > a.pull-right {
float: left !important;
float: left;
}
[dir="rtl"] .typeahead-list {
text-align: right;
}
.cmd-palette .modal-body {
padding: 7px;
}
.cmd-palette form {
background: white;
}
.cmd-palette input {
outline: none;
}
.no-shortcut {
min-width: 20px;
color: transparent;
}
[dir="rtl"] .no-shortcut.pull-right {
float: left !important;
float: left;
}
[dir="rtl"] .command-shortcut.pull-right {
float: left !important;
float: left;
}
.command-shortcut:before {

```

```

content: "(command mode)";
padding-right: 3px;
color: #777777;
}
.edit-shortcut:before {
content: "(edit)";
padding-right: 3px;
color: #777777;
}
[dir="rtl"] .edit-shortcut.pull-right {
float: left !important;
float: left;
}
#find-and-replace #replace-preview .match,
#find-and-replace #replace-preview .insert {
background-color: #BBDEFB;
border-color: #90CAF9;
border-style: solid;
border-width: 1px;
border-radius: 0px;
}
[dir="ltr"] #find-and-replace .input-group-btn + .form-control {
border-left: none;
}
[dir="rtl"] #find-and-replace .input-group-btn + .form-control {
border-right: none;
}
#find-and-replace #replace-preview .replace .match {
background-color: #FFCDD2;
border-color: #EF9A9A;
border-radius: 0px;
}
#find-and-replace #replace-preview .replace .insert {
background-color: #C8E6C9;
border-color: #A5D6A7;
border-radius: 0px;
}
#find-and-replace #replace-preview {
max-height: 60vh;
overflow: auto;
}
#find-and-replace #replace-preview pre {
padding: 5px 10px;
}
.terminal-app {
background: #EEE;
}
.terminal-app #header {
background: #fff;
-webkit-box-shadow: 0px 0px 12px 1px rgba(87, 87, 87, 0.2);
box-shadow: 0px 0px 12px 1px rgba(87, 87, 87, 0.2);
}
.terminal-app .terminal {
width: 100%;
float: left;
font-family: monospace;
color: white;
background: black;
padding: 0.4em;
border-radius: 2px;
-webkit-box-shadow: 0px 0px 12px 1px rgba(87, 87, 87, 0.4);
box-shadow: 0px 0px 12px 1px rgba(87, 87, 87, 0.4);
}
.terminal-app .terminal,
.terminal-app .terminal dummy-screen {
line-height: 1em;
font-size: 14px;
}
.terminal-app .terminal .xterm-rows {
padding: 10px;
}
.terminal-app .terminal-cursor {
color: black;
background: white;
}
.terminal-app #terminado-container {
margin-top: 20px;
}
/* sourceMappingURL=style.min.css.map */

```

```

div#notebook {
overflow: visible;
border-top: none;
}@media print {
div.cell {
display: block;

```

```

    page-break-inside: avoid;
}
div.output_wrapper {
    display: block;
    page-break-inside: avoid;
}
div.output {
    display: block;
    page-break-inside: avoid;
}
}
}
```

In [1]:

```
## 导入基础类库
import pandas as pd
import numpy as np
data1 = pd.read_excel("D:\OneDrive\桌面\model\附件1：123家有信贷记录企业的相关数据.xlsx", sheet_name='企业信息'
)
data2 = pd.read_excel("D:\OneDrive\桌面\model\附件1：123家有信贷记录企业的相关数据.xlsx", sheet_name='进项发票
信息')
data3 = pd.read_excel("D:\OneDrive\桌面\model\附件1：123家有信贷记录企业的相关数据.xlsx", sheet_name='销项发票
信息')
income = pd.merge(data1,data2,on='企业代号')
expense = pd.merge(data1, data3, on = '企业代号')
```

```
</div>
```

In [2]:

```
income
```

```
</div>
```

```
<div class="prompt output_prompt">Out[2]:</div>
```

```
.dataframe tbody tr th {
    vertical-align: top;
}

.dataframe thead th {
    text-align: right;
}
```

	企业代 号	企业名称	信誉评 级	是否违 约	发票号码	开票日期	销方单位代 号	金额	税额	价税合计	发票 状态
0	E1	***电器销售有限公司	A	否	3390939	2017-07-18	A00297	-943.40	-56.60	-1000.00	有效 发票
1	E1	***电器销售有限公司	A	否	3390940	2017-07-18	A00297	-4780.24	-286.81	-5067.05	有效 发票
2	E1	***电器销售有限公司	A	否	3390941	2017-07-18	A00297	943.40	56.60	1000.00	有效 发票
3	E1	***电器销售有限公司	A	否	3390942	2017-07-18	A00297	4780.24	286.81	5067.05	有效 发票
4	E1	***电器销售有限公司	A	否	9902669	2017-08-07	A05061	326.21	9.79	336.00	有效 发票
...
210942	E122	***商贸有限责任公司	D	是	54706234	2019-04-17	A08967	223.30	6.70	230.00	有效 发票
210943	E122	***商贸有限责任公司	D	是	55721344	2020-01-10	A09184	264.15	15.85	280.00	有效 发票
210944	E123	***创科技有限责任公司	D	是	38493295	2017-12-15	A03624	264.15	15.85	280.00	有效 发票
210945	E123	***创科技有限责任公司	D	是	95472001	2018-12-29	A03626	264.15	15.85	280.00	有效 发票
210946	E123	***创科技有限责任公司	D	是	54469883	2019-12-18	A03626	264.15	15.85	280.00	有效 发票

210947 rows × 11 columns

In [3]:

expense

</div>

<div class="prompt output_prompt">Out[3]:</div>

```
.dataframe tbody tr th {
    vertical-align: top;
}

.dataframe thead th {
    text-align: right;
}
```

	企业代号	企业名称	信誉评级	是否违约	发票号码	开票日期	购方单位代号	金额	税额	价税合计	发票状态
0	E1	***电器销售有限公司	A	否	11459356	2017-08-04	B03711	9401.71	1598.29	11000.0	有效发票
1	E1	***电器销售有限公司	A	否	5076239	2017-08-09	B00844	8170.94	1389.06	9560.0	有效发票
2	E1	***电器销售有限公司	A	否	5076240	2017-08-09	B00844	8170.94	1389.06	9560.0	有效发票
3	E1	***电器销售有限公司	A	否	5076241	2017-08-09	B00844	4085.47	694.53	4780.0	有效发票
4	E1	***电器销售有限公司	A	否	5076242	2017-08-09	B00844	4085.47	694.53	4780.0	有效发票
...
162479	E123	***创科技有限责任公司	D	是	8887701	2019-12-17	B10944	4827.67	144.83	4972.5	有效发票
162480	E123	***创科技有限责任公司	D	是	8887702	2019-12-17	B10944	7412.62	222.38	7635.0	有效发票
162481	E123	***创科技有限责任公司	D	是	34173085	2019-12-17	B13093	1917.47	57.53	1975.0	有效发票
162482	E123	***创科技有限责任公司	D	是	8887703	2019-12-25	B13093	7252.42	217.58	7470.0	有效发票
162483	E123	***创科技有限责任公司	D	是	8887704	2019-12-25	B13093	6660.19	199.81	6860.0	有效发票

162484 rows × 11 columns

In [4]:

```
datal.head(5)
```

```
</div>
```

```
<div class="prompt output_prompt">Out[4]:</div>
```

```
.dataframe tbody tr th {
    vertical-align: top;
}

.dataframe thead th {
    text-align: right;
}
```

	企业代号	企业名称	信誉评级	是否违约
0	E1	***电器销售有限公司	A	否
1	E2	***技术有限责任公司	A	否
2	E3	***电子(中国)有限公司***分公司	C	否
3	E4	***发展有限责任公司	C	否
4	E5	***供应链管理有限公司	B	否

In [5]:

```
a_company = datal[datall['信誉评级'] == 'A']
a_number = a_company['信誉评级'].count()
a_default = a_company[a_company['是否违约'] == '是']['信誉评级'].count()
a_default_rate = a_default/a_number
a_default_rate = round(a_default_rate, 4)
print(a_number)
print(a_default)
print(a_default_rate)
```

```
</div>
```

```
<div class="prompt"></div>
```

```
27
0
0.0
```

In [6]:

```
b_company = data1[data1['信誉评级'] == 'B']
b_number = b_company['信誉评级'].count()
b_default = b_company[b_company['是否违约'] == '是']['信誉评级'].count()
b_default_rate = b_default/b_number
b_default_rate = round(b_default_rate, 4)
print(b_number)
print(b_default)
print(b_default_rate)
```

```
</div>
```

```
<div class="prompt"></div>
```

```
38
1
0.0263
```

In [7]:

```
c_company = data1[data1['信誉评级'] == 'C']
c_number = c_company['信誉评级'].count()
c_default = c_company[c_company['是否违约'] == '是']['信誉评级'].count()
c_default_rate = c_default/c_number
c_default_rate = round(c_default_rate, 4)
print(c_number)
print(c_default)
print(c_default_rate)
```

```
</div>
```

```
<div class="prompt"></div>
```

```
34
2
0.0588
```

In [8]:

```
data4 = data1.copy()
data4['default_rate'] = 0
data4.loc[(data4['信誉评级']=='A'),'default_rate'] = a_default_rate
data4.loc[(data4['信誉评级']=='B'),'default_rate'] = b_default_rate
data4.loc[(data4['信誉评级']=='C'),'default_rate'] = c_default_rate
data4.head()
```

```
</div>
```

```
<div class="prompt output_prompt">Out[8]:</div>
```



```
.dataframe tbody tr th {
    vertical-align: top;
}

.dataframe thead th {
    text-align: right;
}
```

	企业代号	企业名称	信誉评级	是否违约	default_rate
0	E1	***电器销售有限公司	A	否	0.0000
1	E2	***技术有限责任公司	A	否	0.0000
2	E3	***电子(中国)有限公司***分公司	C	否	0.0588
3	E4	***发展有限责任公司	C	否	0.0588
4	E5	***供应链管理有限公司	B	否	0.0263

```
In [9]:

import seaborn as sns
import matplotlib.pyplot as plt
def autolabel(rects):
    for rect in rects:
        height = rect.get_height()
        plt.text(rect.get_x()+rect.get_width()/2.-0.2, 1*height, '%s' % float(height))
```

```
x1=[0,1,2]

result1=[a_default_rate]
result2=[b_default_rate]
result3=[c_default_rate]

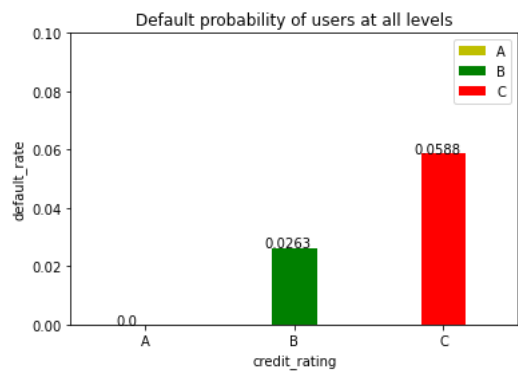
name=['skeleton']
total_width,n=0.9,3
width=total_width/n

a=plt.bar(x1[0],result1,width=width,label='A',tick_label='A',fc='y')
b=plt.bar(x1[1],result2,width=width,label='B',tick_label='B',fc='g')
c=plt.bar(x1[2],result3,width=width,label='C',tick_label='C',fc='r')
autolabel(a)
autolabel(b)
autolabel(c)

plt.xlabel('credit_rating')
plt.ylabel('default_rate')
plt.title('Default probability of users at all levels')
plt.legend()
plt.xlim(-0.5, 2.5)
plt.ylim(0.0, 0.1)
plt.xticks(x1,['A','B','C'])
plt.savefig("Default probability of users at all levels.png")
plt.show()
```

</div>

<div class="prompt"></div>



In [31]:

```
#Python-生成一定范围的随机小数
import random
#小数的范围A ~ B
#随机数的精度round(数值, 精度)
```

```
def _random(a, b, n):
    # 定义一个空列表存储随机数
    a_list = []
    c = random.randint(90, n)
    sum = 0
    while ((len(a_list) < c) & (1-sum > 0.001)):
        d = random.uniform(a, b)
        round(d,4)
        if(d + sum <= 1):
            a_list.append(d)
            sum+=d
        else:
            pass
    while len(a_list) < n:
        a_list.append(0)
```

```
<span class="n">random</span><span class="o">.</span><span class="n">shuffle</span><span class="p">(</span><span class="n">a_list</span><span class="p">)</span>
<span class="k">return</span> <span class="n">a_list</span>
```

```
random_list = _random(0.001, 0.01, 302)
print(random_list)
print(len(random_list))
```

```
</div>
```

```
<div class="prompt"></div>
```

```
[0, 0, 0.009434771695886534, 0.0012496174805247623, 0, 0.0016820603709608011, 0, 0, 0, 0.006629489428524694, 0.007295601329473488, 0, 0.0091663
302
```

In [11]:

```
data5 = pd.read_excel("D:\OneDrive\桌面\model\附件2：302家无信贷记录企业的相关数据.xlsx", sheet_name=' 企业信息')
data6 = pd.read_excel("D:\OneDrive\桌面\model\附件2：302家无信贷记录企业的相关数据.xlsx", sheet_name=' 进项发票信息')
data7 = pd.read_excel("D:\OneDrive\桌面\model\附件2：302家无信贷记录企业的相关数据.xlsx", sheet_name=' 销项发票信息')
income_n = pd.merge(data5, data6, on=' 企业代号')
expense_n = pd.merge(data5, data7, on = ' 企业代号')
```

```
</div>
```

In [12]:

```
from datetime import datetime
income_n['开票日期'] = pd.to_datetime(income_n['开票日期'], format='%Y-%m-%d %H:%M:%S')
income_n['date']=income_n['开票日期']
income_n['date'] =income_n['date'].apply(lambda x:datetime.strptime(x,'%Y-%m'))
```

```
expense_n['开票日期'] = pd.to_datetime(expense_n['开票日期'], format='%Y-%m-%d %H:%M:%S')
expense_n['date']=expense_n['开票日期']
expense_n['date'] =expense_n['date'].apply(lambda x:datetime.strptime(x,'%Y-%m'))
```

```
</div>
```

In [13]:

```
income_n
```

```
</div>
```

```
<div class="prompt output_prompt">Out[13]:</div>
```

```
.dataframe tbody tr th {
    vertical-align: top;
}

.dataframe thead th {
    text-align: right;
}
```

	企业代号	企业名称	发票号码	开票日期	销方单位代号	金额	税额	价税合计	发票状态	date
0	E124	个体经营E124	18891676	2017-09-01 00:00:00	C00014	338.46	57.54	396.0	有效发票	2017-09
1	E124	个体经营E124	18691267	2017-09-01 00:00:00	C00480	230.10	6.90	237.0	有效发票	2017-09
2	E124	个体经营E124	12995412	2017-09-01 00:00:00	C23675	223.30	6.70	230.0	有效发票	2017-09
3	E124	个体经营E124	6378193	2017-09-01 11:11:03	C00333	90090.09	9909.91	100000.0	有效发票	2017-09
4	E124	个体经营E124	6378194	2017-09-01 11:12:01	C00333	90090.09	9909.91	100000.0	有效发票	2017-09
...
395170	E425	***商贸有限公司	72101375	2019-12-30 00:00:00	C23112	663.11	19.89	683.0	有效发票	2019-12
395171	E425	***商贸有限公司	20253285	2020-01-05 00:00:00	C01937	45.41	4.09	49.5	有效发票	2020-01
395172	E425	***商贸有限公司	20253315	2020-01-05 00:00:00	C01937	110.14	1.16	111.3	有效发票	2020-01
395173	E425	***商贸有限公司	52449404	2020-01-06 00:00:00	C15032	73.22	6.58	79.8	有效发票	2020-01
395174	E425	***商贸有限公司	5666299	2020-01-10 00:00:00	C23112	132.04	3.96	136.0	有效发票	2020-01

395175 rows × 10 columns

In [14]:

```
expense_n
```

```
</div>
```

```
<div class="prompt output_prompt">Out[14]:</div>
```

```
.dataframe tbody tr th {
    vertical-align: top;
}

.dataframe thead th {
    text-align: right;
}
```

	企业代号	企业名称	发票号码	开票日期	购方单位代号	金额	税额	价税合计	发票状态	date
0	E124	个体经营E124	15212483	2017-09-01 11:58:43	D00585	839350.55	92328.56	931679.11	有效发票	2017-09
1	E124	个体经营E124	15212484	2017-09-01 11:59:20	D00585	900900.90	99099.10	1000000.00	有效发票	2017-09
2	E124	个体经营E124	15212485	2017-09-01 11:59:51	D00585	900900.90	99099.10	1000000.00	有效发票	2017-09
3	E124	个体经营E124	15212486	2017-09-01 12:00:45	D00585	697365.74	76710.23	774075.97	有效发票	2017-09
4	E124	个体经营E124	6089615	2017-09-05 10:58:38	D00108	726216.22	79883.78	806100.00	有效发票	2017-09
...
330830	E425	***商贸有限公司	21803468	2018-04-03 00:00:00	D21446	9000.00	270.00	9270.00	有效发票	2018-04
330831	E425	***商贸有限公司	21803469	2018-04-03 00:00:00	D21446	5155.34	154.66	5310.00	有效发票	2018-04
330832	E425	***商贸有限公司	21803470	2019-06-11 00:00:00	D02126	4854.37	145.63	5000.00	作废发票	2019-06
330833	E425	***商贸有限公司	21803471	2019-06-11 00:00:00	D02126	4854.37	145.63	5000.00	作废发票	2019-06
330834	E425	***商贸有限公司	21803472	2019-06-11 00:00:00	D02126	4854.37	145.63	5000.00	有效发票	2019-06

330835 rows × 10 columns

In [15]:

```
data5['企业代号'].tolist()
efficiency = (0.039571+0.039924+0.039277)/3
print(efficiency)
```

</div>

<div class="prompt"></div>

0.03959066666666667

In [16]:

```
company_out = income_n[income_n['发票状态'] == '有效发票'].groupby(['企业代号','date']).sum().reset_index()
company_out = company_out.set_index("date")
company_in = expense_n[expense_n['发票状态'] == '有效发票'].groupby(['企业代号','date']).sum().reset_index()
company_in = company_in.set_index("date")
```

</div>

In [17]:

```
company_out
```

</div>

<div class="prompt output_prompt">Out[17]:</div>

```
.dataframe tbody tr th {
    vertical-align: top;
}

.dataframe thead th {
    text-align: right;
}
```

	企业代号	发票号码	金额	税额	价税合计
date					
2017-09	E124	3092361832	15961026.34	1097205.79	17058232.13
2017-10	E124	2774006318	10741042.73	897149.66	11638192.39
2017-11	E124	4083387959	14512592.99	1120696.10	15633289.09
2017-12	E124	5013643203	21876265.20	1806385.95	23682651.15
2018-01	E124	4981678199	37188599.69	2480415.64	39669015.33
...
2019-09	E425	24468933	1354.31	50.09	1404.40
2019-10	E425	270687790	4238.79	256.16	4494.95
2019-11	E425	333866460	4271.70	217.16	4488.86
2019-12	E425	108789873	1065.74	70.29	1136.03
2020-01	E425	98622303	360.81	15.79	376.60

8612 rows × 5 columns

In [18]:

```
company_in
```

```
</div>
```

```
<div class="prompt output_prompt">Out[18]:</div>
```

```
.dataframe tbody tr th {
    vertical-align: top;
}

.dataframe thead th {
    text-align: right;
}
```

	企业代号	发票号码	金额	税额	价税合计
date					
2017-09	E124	452525272	14590753.09	725181.90	15315934.99
2017-10	E124	243931657	14873606.03	1615525.25	16489131.28
2017-11	E124	105426916	18023810.32	1508828.80	19532639.12
2017-12	E124	409701799	39675314.43	2641007.09	42316321.52
2018-01	E124	357393996	21356615.76	2043208.37	23399824.13
...
2019-08	E424	85100813	555.34	16.66	572.00
2019-12	E424	85100817	2536.00	76.08	2612.08
2018-03	E425	109017315	48116.50	1443.50	49560.00
2018-04	E425	87213870	32155.34	964.66	33120.00
2019-06	E425	21803472	4854.37	145.63	5000.00

8410 rows × 5 columns

In [19]:

```
company_data_t = pd.merge(company_in, company_out, how='outer', on=['企业代号', 'date']) #company_in[company_in['企业代号'] == 'E124']# - compan
company_data_t = company_data_t.fillna(0)
company_data_t['profit'] = company_data_t['价税合计_y'] - company_data_t['价税合计_x']
company_data_t
```

</div>

<div class="prompt output_prompt">Out[19]:</div>

```
.dataframe tbody tr th {
    vertical-align: top;
}

.dataframe thead th {
    text-align: right;
}
```

	企业 代号	发票号码_x	金额_x	税额_x	价税合计_x	发票号码_y	金额_y	税额_y	价税合计_y	profit
date										
2017-09	E124	452525272.0	14590753.09	725181.90	15315934.99	3.092362e+09	15961026.34	1097205.79	17058232.13	1742297.14
2017-10	E124	243931657.0	14873606.03	1615525.25	16489131.28	2.774006e+09	10741042.73	897149.66	11638192.39	-4850938.89
2017-11	E124	105426916.0	18023810.32	1508828.80	19532639.12	4.083388e+09	14512592.99	1120696.10	15633289.09	-3899350.03
2017-12	E124	409701799.0	39675314.43	2641007.09	42316321.52	5.013643e+09	21876265.20	1806385.95	23682651.15	-18633670.37
2018-01	E124	357393996.0	21356615.76	2043208.37	23399824.13	4.981678e+09	37188599.69	2480415.64	39669015.33	16269191.20
...
2019-09	E425	0.0	0.00	0.00	0.00	2.446893e+07	1354.31	50.09	1404.40	1404.40
2019-10	E425	0.0	0.00	0.00	0.00	2.706878e+08	4238.79	256.16	4494.95	4494.95
2019-11	E425	0.0	0.00	0.00	0.00	3.338665e+08	4271.70	217.16	4488.86	4488.86
2019-12	E425	0.0	0.00	0.00	0.00	1.087899e+08	1065.74	70.29	1136.03	1136.03
2020-01	E425	0.0	0.00	0.00	0.00	9.862230e+07	360.81	15.79	376.60	376.60

9728 rows × 10 columns

In [50]:

```
company_data = company_data_t.reset_index()[['date', '企业代号', 'profit']]
company_data = company_data.set_index("date")
company_data["profit_sum"] = company_data["profit"].cumsum(axis=0)
company_data["profit_sum"] = company_data["profit_sum"]*efficiency
company_data
```

</div>

<div class="prompt output_prompt">Out[50]:</div>

```
.dataframe tbody tr th {
    vertical-align: top;
}

.dataframe thead th {
    text-align: right;
}
```

	企业代号	profit	profit_sum
date			
2017-09	E124	1742297.14	6.897871e+04
2017-10	E124	-4850938.89	-1.230732e+05
2017-11	E124	-3899350.03	-2.774511e+05
2017-12	E124	-18633670.37	-1.015170e+06
2018-01	E124	16269191.20	-3.710624e+05
...
2019-09	E425	1404.40	-2.890355e+08
2019-10	E425	4494.95	-2.890354e+08
2019-11	E425	4488.86	-2.890352e+08
2019-12	E425	1136.03	-2.890351e+08
2020-01	E425	376.60	-2.890351e+08

9728 rows × 3 columns

In [51]:

```
company_profit = company_data[company_data['企业代号'] == 'E124']
company_profit
```

```
</div>
```

```
<div class="prompt output_prompt">Out[51]:</div>
```

```
.dataframe tbody tr th {
    vertical-align: top;
}

.dataframe thead th {
    text-align: right;
}
```

	企业代号	profit	profit_sum
date			
2017-09	E124	1742297.14	6.897871e+04
2017-10	E124	-4850938.89	-1.230732e+05
2017-11	E124	-3899350.03	-2.774511e+05
2017-12	E124	-18633670.37	-1.015170e+06
2018-01	E124	16269191.20	-3.710624e+05
2018-02	E124	-6461036.58	-6.268591e+05
2018-03	E124	1605036.55	-5.633147e+05
2018-04	E124	9914905.24	-1.707769e+05
2018-05	E124	-11079320.32	-6.094146e+05
2018-06	E124	9828753.31	-2.202877e+05
2018-07	E124	6771729.45	4.780956e+04
2018-08	E124	4766864.59	2.365329e+05
2018-09	E124	5739876.20	4.637784e+05
2018-10	E124	-5034003.15	2.644789e+05
2018-11	E124	11603449.49	7.238672e+05
2018-12	E124	418682.21	7.404431e+05
2019-01	E124	-8633530.07	3.986359e+05
2019-02	E124	-9886925.00	7.205936e+03
2019-03	E124	7873770.88	3.189338e+05
2019-04	E124	2156662.89	4.043175e+05
2019-05	E124	15418112.76	1.014731e+06
2019-06	E124	-3281984.19	8.847949e+05
2019-07	E124	10194047.45	1.288384e+06
2019-08	E124	5825682.82	1.519027e+06
2019-09	E124	-2603254.52	1.415962e+06

In [52]:

```
# 创建空的DataFrame变量，用于存储公司数据
CompanyProfit = pd.DataFrame()
```

#profit_value_list=[] #存储每个公司的平均市值

```
# 创建公司代号的列表
company_list = data5['企业代号'].tolist()
# 使用循环，挨个获取每只股票的数据，并存储每日收盘价
for company in company_list:
    company_profit = company_data[company_data['企业代号'] == company]
```

```
<span class="n">CompanyProfit</span><span class="p">[</span><span class="n">company</span><span class="p">]</span> <span class="o">=</span> <span class="n">company_profit</span><span class="p">[</span><span class="s">&#39;profit_sum&#39;</span><span class="p">]</span> <span class="c">#获取每个公司的利润</span>
```

```
CompanyProfit.index.name = 'date' #日期为索引
# 输出数据的前5行
for column in list(CompanyProfit.columns[CompanyProfit.isnull().sum() > 0]):
    mean_val = CompanyProfit[column].mean()
    CompanyProfit[column].fillna(mean_val, inplace=True)

CompanyProfit
```

```
</div>
```

```
<div class="prompt output_prompt">Out[52]:</div>
```



```
.dataframe tbody tr th {
    vertical-align: top;
}

.dataframe thead th {
    text-align: right;
}
```

	E124	E125	E126	E127	E128	E129	E130	E131	E132
date									
2017-09	6.897871e+04	-2.037270e+05	-9.262178e+05	-2.235691e+07	-4.396025e+07	-5.394446e+07	-6.327799e+07	-6.629389e+07	-7.07513
2017-10	-1.230732e+05	-3.996141e+05	-1.240618e+06	-2.274337e+07	-4.396377e+07	-5.443668e+07	-6.327748e+07	-6.639338e+07	-7.08620
2017-11	-2.774511e+05	-5.605839e+05	-1.921767e+06	-2.317442e+07	-4.398158e+07	-5.532893e+07	-6.327677e+07	-6.654515e+07	-7.10113
2017-12	-1.015170e+06	-1.338258e+06	-2.689980e+06	-2.568782e+07	-4.396715e+07	-5.589342e+07	-6.328509e+07	-6.646776e+07	-7.11991
2018-01	-3.710624e+05	-7.111556e+05	-3.324496e+06	-2.696701e+07	-4.427490e+07	-5.622106e+07	-3.061661e+08	-6.672585e+07	-7.15568
2018-02	-6.268591e+05	-1.001561e+06	-3.389722e+06	-2.768106e+07	-4.457424e+07	-5.632171e+07	-3.061648e+08	-6.676220e+07	-7.17085
2018-03	-5.633147e+05	-9.392913e+05	-3.700160e+06	-2.829129e+07	-4.456826e+07	-5.669055e+07	-3.061672e+08	-6.685869e+07	-7.17034
2018-04	-1.707769e+05	-5.510550e+05	-3.797984e+06	-2.872404e+07	-4.520731e+07	-5.716261e+07	-3.061664e+08	-6.696129e+07	-7.17813
2018-05	-6.094146e+05	-1.009393e+06	-4.220466e+06	-2.990972e+07	-4.574667e+07	-5.752869e+07	-3.061615e+08	-6.711061e+07	-7.18967
2018-06	-2.202877e+05	-7.084071e+05	-4.726097e+06	-3.009353e+07	-4.587399e+07	-5.775788e+07	-3.061604e+08	-6.726444e+07	-7.21825
2018-07	4.780956e+04	-5.396995e+05	-5.066900e+06	-3.121565e+07	-4.587229e+07	-5.800478e+07	-3.061586e+08	-6.740268e+07	-7.25261
2018-08	2.365329e+05	-4.067185e+05	-5.404228e+06	-3.173065e+07	-4.607534e+07	-5.836449e+07	-6.328150e+07	-6.756025e+07	-7.27106
2018-09	4.637784e+05	-1.812419e+05	-5.903335e+06	-3.289371e+07	-4.606220e+07	-5.882789e+07	-6.327925e+07	-6.771854e+07	-7.29616
2018-10	2.644789e+05	-3.866828e+05	-6.317990e+06	-3.328779e+07	-4.617163e+07	-5.913744e+07	-6.328175e+07	-6.792372e+07	-7.32509
2018-11	7.238672e+05	6.515446e+04	-7.026272e+06	-3.374996e+07	-4.626803e+07	-5.953049e+07	-6.336434e+07	-6.819471e+07	-7.33466
2018-12	7.404431e+05	5.498484e+04	-7.925464e+06	-3.563360e+07	-4.678605e+07	-6.003911e+07	-6.331582e+07	-6.784170e+07	-7.35370
2019-01	3.986359e+05	-3.665528e+05	-8.849580e+06	-3.796144e+07	-4.837184e+07	-6.089454e+07	-6.363529e+07	-6.798900e+07	-7.41943
2019-02	7.205936e+03	-7.645141e+05	-8.846317e+06	-3.824928e+07	-3.061849e+08	-6.089788e+07	-6.373089e+07	-6.807676e+07	-7.40498
2019-03	3.189338e+05	-4.673053e+05	-9.486106e+06	-3.842498e+07	-3.061782e+08	-6.126185e+07	-3.061232e+08	-6.813050e+07	-7.41152
2019-04	4.043175e+05	-3.967131e+05	-1.022430e+07	-3.895110e+07	-4.847896e+07	-6.151479e+07	-6.376836e+07	-6.852643e+07	-7.41166
2019-05	1.014731e+06	1.655922e+05	-1.031934e+07	-3.942617e+07	-5.002165e+07	-6.169052e+07	-6.388310e+07	-6.856794e+07	-7.41550
2019-06	8.847949e+05	-2.240193e+04	-1.135557e+07	-3.984121e+07	-5.059678e+07	-6.186347e+07	-6.400059e+07	-6.864112e+07	-7.44463
2019-07	1.288384e+06	3.200469e+05	-1.214624e+07	-4.006142e+07	-5.083278e+07	-6.238895e+07	-6.465404e+07	-6.873363e+07	-7.46917
2019-08	1.519027e+06	5.130896e+05	-1.290209e+07	-4.047844e+07	-5.141577e+07	-6.256182e+07	-6.468765e+07	-6.880672e+07	-7.48989
2019-09	1.415962e+06	7.482705e+05	-1.313984e+07	-4.079869e+07	-3.061704e+08	-6.270866e+07	-6.488582e+07	-6.892310e+07	-7.48920

25 rows × 302 columns

```
CompanyReturns = CompanyProfit.pct_change().fillna(0)
```

```
company_return = CompanyReturns.copy()
```

CompanyReturns

```
</div>
```

```
<div class="prompt output_prompt">Out[53]:</div>
```

```
.dataframe tbody tr th {  
    vertical-align: top;  
}  
  
.dataframe thead th {  
    text-align: right;  
}
```

	E124	E125	E126	E127	E128	E129	E130	E131	E132	E133	...	E416
date												
2017-09	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	...	0.000000e+
2017-10	-2.784220	0.961517	0.339445	0.017286	0.000080	0.009125	-0.000008	0.001501	0.001565	-0.000064	...	3.242127e-01
2017-11	1.254358	0.402813	0.549041	0.018953	0.000405	0.016391	-0.000011	0.002286	0.002107	-0.000072	...	3.877706e-01
2017-12	2.658917	1.387257	0.399743	0.108456	-0.000328	0.010202	0.000132	-0.001163	0.002645	-0.000608	...	-3.140690e-02
2018-01	-0.634483	-0.468596	0.235881	0.049798	0.007000	0.005862	3.837888	0.003883	0.005024	-0.747978	...	0.000000e+
2018-02	0.689363	0.408357	0.019620	0.026479	0.006761	0.001790	-0.000004	0.000545	0.002120	2.966709	...	0.000000e+
2018-03	-0.101370	-0.062173	0.091582	0.022045	-0.000134	0.006549	0.000008	0.001445	-0.000071	-0.000071	...	0.000000e+
2018-04	-0.696836	-0.413329	0.026438	0.015296	0.014339	0.008327	-0.000003	0.001535	0.001086	-0.000162	...	0.000000e+
2018-05	2.568483	0.831747	0.111238	0.041278	0.011931	0.006404	-0.000016	0.002230	0.001607	-0.747808	...	0.000000e+
2018-06	-0.638526	-0.298185	0.119805	0.006146	0.002783	0.003984	-0.000003	0.002292	0.003975	2.965101	...	0.000000e+
2018-07	-1.217032	-0.238151	0.072111	0.037288	-0.000037	0.004275	-0.000006	0.002055	0.004761	-0.000014	...	-2.431712e-02
2018-08	3.947398	-0.246398	0.066575	0.016498	0.004426	0.006201	-0.793305	0.002338	0.002543	-0.000049	...	2.492318e-01
2018-09	0.960735	-0.554380	0.092355	0.036654	-0.000285	0.007940	-0.000036	0.002343	0.003453	-0.747815	...	0.000000e+
2018-10	-0.429730	1.133518	0.070241	0.011980	0.002376	0.005262	0.000039	0.003030	0.003965	2.963844	...	0.000000e+
2018-11	1.736956	-1.168496	0.112106	0.013884	0.002088	0.006646	0.001305	0.003990	0.001307	-0.747958	...	0.000000e+
2018-12	0.022899	-0.156085	0.127976	0.055812	0.011196	0.008544	-0.000766	-0.005177	0.002596	-0.000643	...	0.000000e+
2019-01	-0.461625	-7.666434	0.116601	0.065327	0.033895	0.014248	0.005046	0.002171	0.008938	0.004826	...	0.000000e+
2019-02	-0.981924	1.085686	-0.000369	0.007582	5.329817	0.000055	0.001502	0.001291	-0.001948	-0.000161	...	0.000000e+
2019-03	43.259870	-0.388755	0.072323	0.004594	-0.000022	0.005977	3.803372	0.000789	0.000883	0.001062	...	-2.431716e-02
2019-04	0.267716	-0.151062	0.077819	0.013692	-0.841664	0.004129	-0.791690	0.005811	0.000019	0.010447	...	-7.203858e-08
2019-05	1.509738	-1.417410	0.009295	0.012197	0.031822	0.002857	0.001799	0.000606	0.000518	0.005955	...	2.492329e-01
2019-06	-0.128050	-1.135284	0.100416	0.010527	0.011498	0.002804	0.001839	0.001067	0.003929	0.002153	...	-2.431727e-02
2019-07	0.456139	-15.286578	0.069629	0.005527	0.004664	0.008494	0.010210	0.001348	0.003296	0.002975	...	2.492333e-01
2019-08	0.179017	0.603170	0.062230	0.010409	0.011469	0.002771	0.000520	0.001063	0.002774	2.863659	...	0.000000e+
2019-09	-0.067849	0.458362	0.018427	0.007912	4.954796	0.002347	0.003063	0.001691	-0.000092	-0.740863	...	3.242223e-01

25 rows × 302 columns

In [54]:

```
# 设置组合权重, 存储为numpy数组类型
portfolio_weights = np.array([0, 0, 0.009434771695886534, 0.0012496174805247623, 0, 0.0016820603709608011, 0, 0, 0, 0.006629489428524694, 0.007
# 计算加权的股票收益
WeightedReturns = company_return.mul(portfolio_weights, axis=1)
# 计算投资组合的收益
CompanyReturns['Portfolio'] = WeightedReturns.sum(axis=1)
# 打印前5行数据
print(CompanyReturns.head())
```

```
# 绘制组合收益随时间变化的图
CompanyReturns.Portfolio.plot()
plt.show()
```

</div>

<div class="prompt"></div>

	E124	E125	E126	E127	E128	E129	E130 \
date							
2017-09	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2017-10	-2.784220	0.961517	0.339445	0.017286	0.000080	0.009125	-0.000008
2017-11	1.254358	0.402813	0.549041	0.018953	0.000405	0.016391	-0.000011
2017-12	2.658917	1.387257	0.399743	0.108456	-0.000328	0.010202	0.000132
2018-01	-0.634483	-0.468596	0.235881	0.049798	0.007000	0.005862	3.837888

	E131	E132	E133 ...	E417	E418 \
--	------	------	----------	------	--------

```
date
2017-09 0.000000 0.000000 0.000000 ... 0.000000e+00 0.000000e+00
2017-10 0.001501 0.001565 -0.000064 ... -5.744562e-08 0.000000e+00
2017-11 0.002286 0.002107 -0.000072 ... 9.696398e-03 -2.667691e-02
2017-12 -0.001163 0.002645 -0.000608 ... 4.802326e-02 -1.213204e-07
2018-01 0.003883 0.005024 -0.747978 ... -5.498614e-02 5.823773e-02
```

	E419	E420	E421 E422	E423	E424 E425 \
--	------	------	-----------	------	-------------

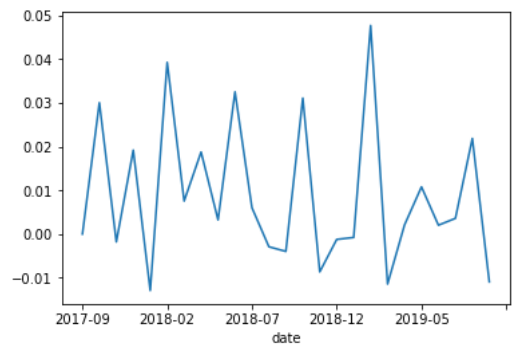
```
date
2017-09 0.000000 0.000000 0.000000 0.0 0.000000 0.000000e+00 0.0
2017-10 -0.000001 -0.000006 -0.017923 0.0 0.013691 0.000000e+00 0.0
2017-11 -0.000021 -0.000012 0.018250 0.0 -0.013508 1.675779e-02 0.0
2017-12 -0.000007 -0.000003 0.040312 0.0 -0.000001 2.769927e-07 0.0
2018-01 -0.000007 -0.000013 -0.038750 0.0 0.013694 4.741146e-08 0.0
```

Portfolio

```
date
2017-09 0.000000
2017-10 0.030008
2017-11 -0.001796
2017-12 0.019171
2018-01 -0.012902
```

[5 rows x 303 columns]

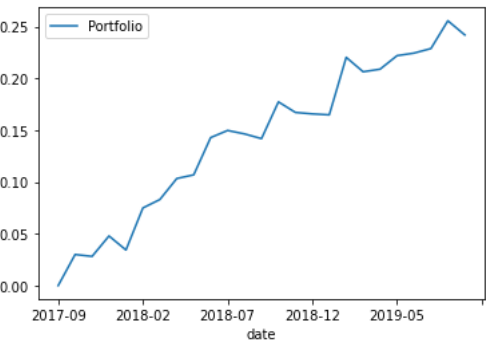
<div class="prompt"></div>



```
# 定义累积收益曲线绘制函数
def cumulative_returns_plot(name_list):
    for name in name_list:
        CumulativeReturns = ((1+CompanyReturns[name]).cumprod()-1)
        CumulativeReturns.plot(label=name)
    plt.legend()
    plt.show()
# 计算累积的组合收益，并绘图
cumulative_returns_plot(['Portfolio'])
```

</div>

<div class="prompt"></div>



In [56]:

```
# 设置投资组合中公司的数目
numcompanies = 302
# 平均分配每一项的权重
portfolio_weights_ew = np.repeat(1/numcompanies, numcompanies)
# 计算等权重组合的收益
CompanyReturns['Portfolio_EW'] = company_return.mul(portfolio_weights_ew, axis=1).sum(axis=1)
# 打印前5行数据
print(CompanyReturns.head())
# 绘制累积收益曲线
cumulative_returns_plot(['Portfolio', 'Portfolio_EW'])
```

</div>

<div class="prompt"></div>

date	E124	E125	E126	E127	E128	E129	E130 \
2017-09	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2017-10	-2.784220	0.961517	0.339445	0.017286	0.000080	0.009125	-0.000008
2017-11	1.254358	0.402813	0.549041	0.018953	0.000405	0.016391	-0.000011
2017-12	2.658917	1.387257	0.399743	0.108456	-0.000328	0.010202	0.000132
2018-01	-0.634483	-0.468596	0.235881	0.049798	0.007000	0.005862	3.837888

	E131	E132	E133 ...	E418	E419	E420 \
--	------	------	----------	------	------	--------

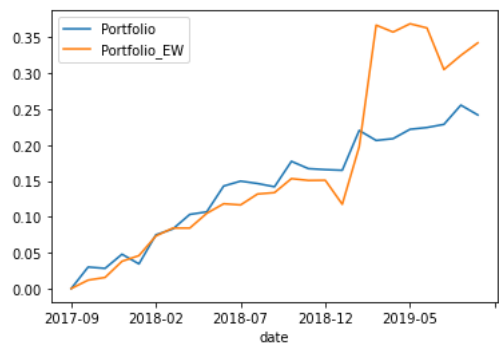
date	...
2017-09	0.000000 0.000000 0.000000 ... 0.000000e+00 0.000000 0.000000
2017-10	0.001501 0.001565 -0.000064 ... 0.000000e+00 -0.000001 -0.000006
2017-11	0.002286 0.002107 -0.000072 ... -2.667691e-02 -0.000021 -0.000012
2017-12	-0.001163 0.002645 -0.000608 ... -1.213204e-07 -0.000007 -0.000003
2018-01	0.003883 0.005024 -0.747978 ... 5.823773e-02 -0.000007 -0.000013

	E421	E422	E423	E424	E425	Portfolio	Portfolio_EW
--	------	------	------	------	------	-----------	--------------

date	
2017-09	0.000000 0.0 0.000000 0.000000e+00 0.0 0.000000 0.000000
2017-10	-0.017923 0.0 0.013691 0.000000e+00 0.0 0.030008 0.011792
2017-11	0.018250 0.0 -0.013508 1.675779e-02 0.0 -0.001796 0.003655
2017-12	0.040312 0.0 -0.000001 2.769927e-07 0.0 0.019171 0.022205
2018-01	-0.038750 0.0 0.013694 4.741146e-08 0.0 -0.012902 0.007600

[5 rows x 304 columns]

<div class="prompt"></div>



In [57]:

计算相关矩阵
correlation_matrix = company_return.corr()
输出相关矩阵
correlation_matrix

</div>

<div class="prompt output_prompt">Out[57]:</div>

.dataframe tbody tr th {
 vertical-align: top;
}

.dataframe thead th {
 text-align: right;
}
}

	E124	E125	E126	E127	E128	E129	E130	E131	E132	E133	...	E416
E124	1.000000	0.032927	-0.060606	-0.130097	-0.084469	0.017270	0.637735	-0.082938	-0.143562	-0.081644	...	-0.321770
E125	0.032927	1.000000	0.133854	0.046056	0.137341	-0.287486	0.025133	-0.036692	-0.387208	0.132613	...	-0.250482
E126	-0.060606	0.133854	1.000000	0.451694	-0.241941	0.718344	0.100356	-0.017597	0.200464	-0.152475	...	-0.141784
E127	-0.130097	0.046056	0.451694	1.000000	-0.192947	0.481819	0.054854	-0.309394	0.452160	-0.208776	...	-0.396212
E128	-0.084469	0.137341	-0.241941	-0.192947	1.000000	-0.356642	-0.042615	-0.064662	-0.420504	-0.161175	...	0.255960
...
E421	0.036461	-0.030536	0.169383	0.064137	-0.288852	0.119157	-0.191837	0.236194	0.049876	0.079470	...	-0.428650
E422	-0.689559	0.013492	0.012045	0.035190	-0.128030	-0.061815	-0.590055	0.381759	-0.045601	0.063464	...	0.196614
E423	0.011658	0.061426	0.048482	-0.122420	0.001815	-0.166769	0.065700	-0.257870	-0.242338	0.202390	...	0.288926
E424	-0.326794	-0.193257	0.087034	0.019119	-0.077999	0.061180	-0.261067	0.084790	-0.045399	0.116187	...	0.406832
E425	-0.034754	0.368656	0.014988	-0.076399	0.001138	-0.125377	0.000673	0.023790	-0.039709	0.006451	...	-0.296967

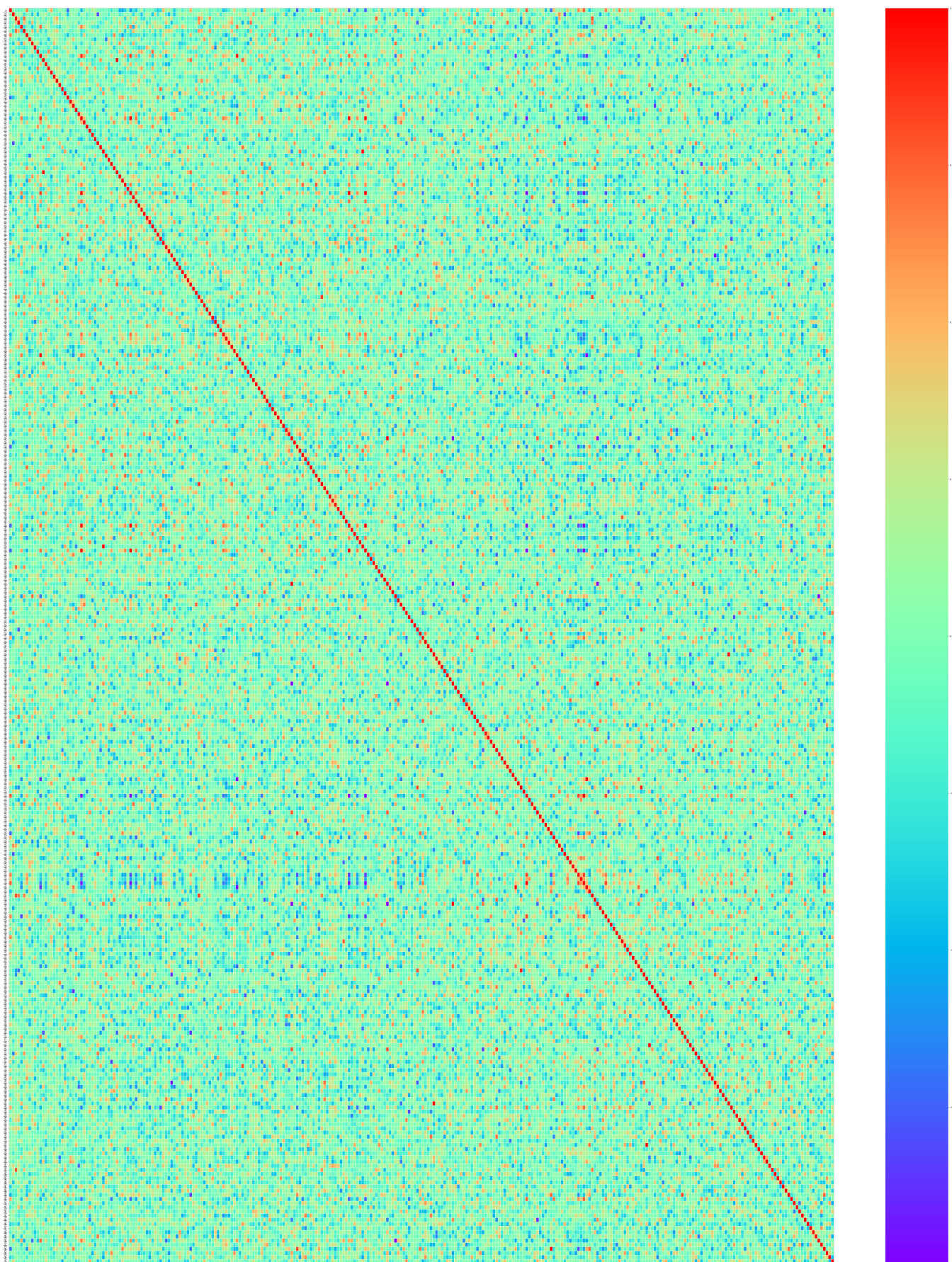
302 rows × 302 columns

In [64]:

#创建热图
plt.figure(figsize=(80, 100))
sns.heatmap(correlation_matrix,cmap='rainbow',linewidths=0.005)
plt.xticks(rotation=0)
plt.yticks(rotation=75)
plt.show()

</div>

```
<div class="prompt"></div>
```



In [58]:

```
# 计算协方差矩阵
cov_mat = company_return.cov()
```

输出协方差矩阵
cov_mat

```
</div>
```

```
<div class="prompt output_prompt">Out[58]:</div>
```

```
.dataframe tbody tr th {
    vertical-align: top;
}

.dataframe thead th {
    text-align: right;
}
```

	E124	E125	E126	E127	E128	E129	E130	E131	E132	E133	...	E416
E124	75.650533	0.987067	-0.069222	-0.027675	-1.060248	0.000590	6.094401	-0.001422	-0.002759	-0.854738	...	-0.046679
E125	0.987067	11.879082	0.060583	0.003882	0.683120	-0.003891	0.095173	-0.000249	-0.002949	0.550150	...	-0.014399
E126	-0.069222	0.060583	0.017244	0.001451	-0.045850	0.000370	0.014480	-0.000005	0.000058	-0.024100	...	-0.000311
E127	-0.027675	0.003882	0.001451	0.000598	-0.006810	0.000046	0.001474	-0.000015	0.000024	-0.006146	...	-0.000162
E128	-1.060248	0.683120	-0.045850	-0.006810	2.082620	-0.002021	-0.067571	-0.000184	-0.001341	-0.279966	...	0.006161
...
E421	0.009221	-0.003060	0.000647	0.000046	-0.012120	0.000014	-0.006128	0.000014	0.000003	0.002781	...	-0.000208
E422	-0.100532	0.000779	0.000027	0.000014	-0.003097	-0.000004	-0.010867	0.000013	-0.000002	0.001280	...	0.000055
E423	0.002742	0.005725	0.000172	-0.000081	0.000071	-0.000018	0.001952	-0.000014	-0.000014	0.006587	...	0.000130
E424	-0.088982	-0.020852	0.000358	0.000015	-0.003524	0.000008	-0.008980	0.000005	-0.000003	0.004378	...	0.000212
E425	-0.007208	0.030299	0.000047	-0.000045	0.000039	-0.000012	0.000018	0.000001	-0.000002	0.000185	...	-0.000118

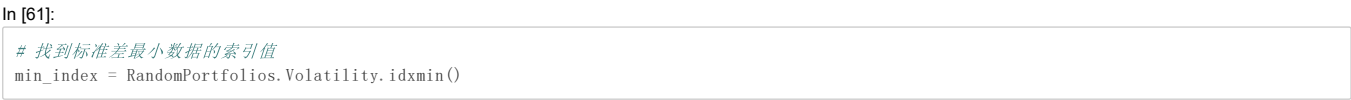
302 rows × 302 columns

In [60]:

```
# 设置模拟的次数
number = 9000
# 设置空的numpy数组，用于存储每次模拟得到的权重、收益率和标准差
random_p = np.empty((number, 304))
# 设置随机数种子，这里是为了结果可重复
np.random.seed(304)
```

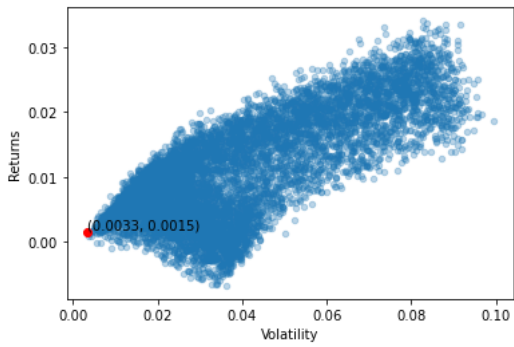
#循环模拟9000次随机的投资组合
for i in range(number):
 #生成302个随机数，得到一组随机的权重数据
 random_weight=_random(0.001, 0.01, 302)

<div class="prompt"></div>



```
# 在收益-风险散点图中突出风险最小的点
RandomPortfolios.plot("Volatility", "Returns", kind='scatter', alpha=0.3)
```

<div class="prompt"></div>



```
In [63]: # 提取最小波动组合对应的权重, 并转换成Numpy数组
GMV_weights = np.array(RandomPortfolios.iloc[min_index, 0:numcompanies])
# 计算GMV投资组合收益
CompanyReturns['Portfolio_GMV'] = company_return.mul(GMV_weights, axis=1).sum(axis=1)
#输出风险最小投资组合的权重
print(GMV_weights)
```

</div>

<div class="prompt"></div>

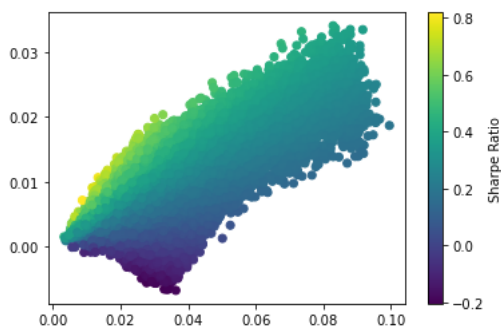
```
[0.      0.      0.      0.      0.      0.00517701
0.      0.      0.00677059 0.      0.      0.
0.      0.      0.      0.00899307 0.00885824 0.
0.      0.      0.00125017 0.      0.      0.00223226
0.      0.      0.      0.      0.00119821 0.
0.      0.00817303 0.      0.      0.00999445 0.00332377
0.00183165 0.00126035 0.0072624 0.      0.      0.
0.      0.      0.      0.      0.      0.00140894
0.00528842 0.      0.00761175 0.      0.00995134 0.00199347
0.      0.00705457 0.      0.0048114 0.      0.00393489
0.      0.00734016 0.      0.      0.00233731 0.00450239
0.      0.0045684 0.      0.00186469 0.      0.00513958
0.00759487 0.00449376 0.      0.      0.00720827 0.
0.006354 0.      0.      0.      0.00502698 0.
0.      0.      0.      0.      0.00497041 0.
0.      0.      0.      0.      0.00157959 0.
0.0035483 0.      0.00358841 0.      0.      0.00754756
0.00862044 0.00769765 0.      0.      0.00813842 0.
0.00122093 0.      0.00102108 0.00544835 0.      0.
0.00924145 0.00440749 0.00499177 0.      0.00746638 0.
0.      0.      0.00999016 0.      0.      0.
0.      0.00283395 0.00273324 0.00391526 0.      0.
0.      0.00275834 0.00585714 0.      0.      0.00834738
0.00967717 0.      0.00354146 0.      0.      0.00548579
0.      0.      0.      0.00633519 0.00131754 0.002546
0.      0.00423299 0.00763076 0.00586183 0.00848447 0.
0.      0.00391259 0.00384094 0.00867559 0.      0.00907959
0.      0.      0.      0.      0.00462744 0.
0.      0.      0.      0.      0.      0.
0.00868035 0.      0.      0.00970307 0.00798004 0.
0.      0.00961038 0.00970221 0.      0.      0.
0.      0.      0.      0.00499387 0.      0.
0.      0.      0.      0.      0.00251782 0.006794
0.0058036 0.      0.      0.00236743 0.      0.00182583
0.      0.00335035 0.00382397 0.00782074 0.      0.00905884
0.      0.0039164 0.00167029 0.      0.00486603 0.
0.      0.00324843 0.      0.      0.00460987 0.00320148
0.00786148 0.      0.00628 0.      0.      0.00566696
0.00833844 0.00144343 0.0040463 0.      0.      0.00240259
0.      0.00333479 0.      0.      0.0010089 0.
0.      0.      0.      0.      0.      0.
0.      0.      0.00237324 0.00143565 0.00900569 0.0079207
0.      0.      0.00675576 0.00577297 0.      0.
0.      0.00271353 0.00921725 0.00218311 0.      0.0095565
0.00343385 0.      0.      0.00650787 0.00386038 0.00521489
0.      0.      0.      0.      0.      0.
0.00470523 0.00634201 0.0014387 0.      0.      0.00428143
0.00433699 0.      0.      0.      0.00631289 0.00868264
0.00946819 0.      0.      0.      0.      0.
0.      0.      0.      0.00990595 0.      0.
0.      0.      ]
```

In [64]:

```
# 设置无风险回报率为0
risk_free = 0
# 计算每项资产的夏普比率
RandomPortfolios['Sharpe'] = (RandomPortfolios>Returns - risk_free) / RandomPortfolios.Volatility
# 绘制收益-标准差的散点图，并用颜色描绘夏普比率
plt.scatter(RandomPortfolios.Volatility, RandomPortfolios>Returns, c=RandomPortfolios.Sharpe)
plt.colorbar(label='Sharpe Ratio')
plt.show()
```

</div>

<div class="prompt"></div>

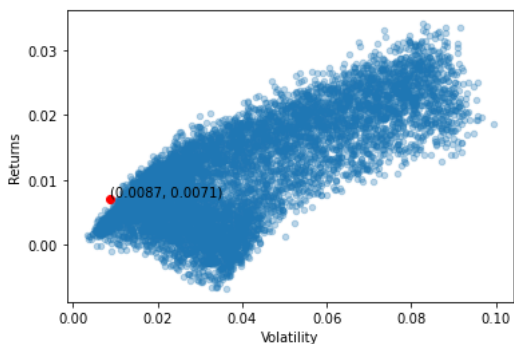


In [65]:

```
# 找到夏普比率最大数据对应的索引值
max_index = RandomPortfolios.Sharpe.argmax()
# 在收益-风险散点图中突出夏普比率最大的点
RandomPortfolios.plot('Volatility', 'Returns', kind='scatter', alpha=0.3)
x = RandomPortfolios.loc[max_index, 'Volatility']
y = RandomPortfolios.loc[max_index, 'Returns']
plt.scatter(x, y, color='red')
# 将该点坐标显示在图中并保留四位小数
plt.text(np.round(x, 4), np.round(y, 4), (np.round(x, 4), np.round(y, 4)), ha='left', va='bottom', fontsize=10)
plt.show()
```

</div>

<div class="prompt"></div>



In [66]:

```
# 提取最大夏普比率组合对应的权重，并转化为numpy数组
MSR_weights = np.array(RandomPortfolios.iloc[max_index, 0:numcompanies])
# 计算MSR组合的收益
CompanyReturns['Portfolio_MSR'] = company_return.mul(MSR_weights, axis=1).sum(axis=1)
# 输出夏普比率最大的投资组合的权重
print(MSR_weights)
```

</div>

<div class="prompt"></div>

```
[0.      0.      0.00725014 0.0013453  0.      0.
0.00515237 0.      0.00757142 0.00233683 0.00692271 0.
0.      0.00491469 0.      0.      0.      0.00487636
0.00247248 0.00922673 0.00265783 0.      0.      0.00932167
0.      0.      0.0027955  0.      0.      0.00116558
0.00792383 0.00976706 0.00469706 0.      0.00933008 0.00792396
0.00420406 0.00201471 0.      0.00102224 0.00748118 0.00968287
0.      0.00220953 0.      0.00805622 0.0064853  0.
0.00843115 0.0028081  0.00702254 0.00108485 0.00681266 0.00326104
0.      0.00361832 0.      0.00155162 0.00395733 0.0022952
0.00529589 0.00630532 0.      0.      0.00612913 0.00771267
0.      0.      0.      0.      0.00912294 0.00857172
0.00676653 0.00134926 0.      0.00990096 0.00753989 0.00733493
0.00294959 0.00322157 0.00748495 0.00202691 0.00553625 0.00697218
0.00531188 0.00173241 0.0023781  0.00510053 0.00943  0.
0.00167987 0.00400919 0.      0.      0.      0.
0.      0.00442659 0.00813353 0.      0.      0.00513009
0.      0.      0.      0.00239359 0.00843159 0.00205054
0.00271421 0.00676351 0.00515749 0.      0.00525106 0.
0.      0.00844393 0.00459959 0.      0.00947469 0.0021763
0.00797156 0.00602213 0.00514844 0.      0.0057702  0.
0.00870648 0.      0.      0.      0.      0.00270546
0.      0.      0.00627454 0.00849977 0.00126506 0.
0.      0.00781003 0.00123698 0.      0.      0.0094876
0.00238277 0.      0.00744623 0.00718202 0.00344352 0.00691578
0.      0.      0.00200669 0.00532765 0.      0.00873089
0.00981552 0.      0.00165089 0.      0.00874579 0.00108006
0.      0.00290175 0.0096338  0.00140899 0.00158125 0.
0.      0.00392364 0.      0.00152175 0.      0.00596059
0.      0.00774051 0.00476908 0.00940171 0.      0.00948975
0.      0.00886718 0.      0.00269841 0.00908217 0.00330226
0.00995019 0.      0.00910812 0.00320796 0.00409296 0.00288884
0.00624299 0.      0.      0.      0.00197602 0.00356435
0.0022371  0.      0.      0.00945877 0.00981215 0.00133611
0.00330696 0.00167587 0.00430855 0.00997662 0.00537164 0.
0.      0.      0.      0.00744568 0.      0.00319521
0.      0.00782602 0.00546508 0.      0.0083157  0.00261265
0.00942093 0.      0.00595819 0.00768339 0.00366973 0.00415653
0.      0.00984432 0.00911314 0.      0.      0.
0.      0.      0.00690717 0.      0.00422145 0.
0.00786992 0.00602336 0.00569672 0.      0.00637861 0.00678401
0.      0.00178699 0.      0.00425352 0.      0.
0.00652139 0.00705884 0.00359965 0.00799338 0.      0.00900228
0.      0.00228791 0.      0.      0.00118185 0.00211804
0.      0.00415951 0.      0.      0.      0.00417651
0.00395177 0.005588  0.00669002 0.00375008 0.00427467 0.00209361
0.00156536 0.00960345 0.      0.00728988 0.00618303 0.
0.00476092 0.00552271 0.00202029 0.      0.00397587 0.
0.      0.      0.00379043 0.0037425  0.00923127 0.
0.00885442 0.      0.00330287 0.00210845 0.00681184 0.00675768
0.      0.      ]
```

In [67]:

```
print(MSR_weights*10000)
```

</div>

<div class="prompt"></div>

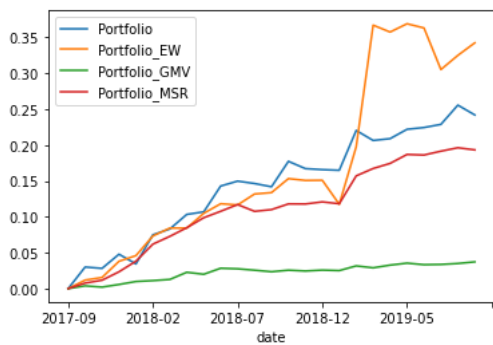
```
[ 0.          0.          72.50144306 13.45295646  0.          0.
51.52368446  0.          75.71415767 23.36827195 69.22712647  0.
 0.          49.14686975  0.          0.          0.          48.763649
24.724803    92.26726603 26.57830283  0.          0.          93.2167269
 0.          0.          27.95501288  0.          0.          11.6557828
79.23828228 97.67060213 46.97060799  0.          93.30076543 79.23964729
42.0406014  20.1470559  0.          10.22239396 74.81180758 96.82865787
 0.          22.09528311  0.          80.56221012 64.85297633  0.
84.31147946 28.0810004  70.22544758 10.84849222 68.12658189 32.61038474
 0.          36.18324612  0.          15.51618451 39.5732579  22.95197118
52.9589215  63.05322375  0.          0.          61.29125024 77.12674991
 0.          0.          0.          0.          91.22941449 85.71723072
67.66531686 13.49264385  0.          99.00958642 75.39889087 73.34932749
29.49591758 32.21572484 74.84952197 20.26911876 55.36249774 69.72184514
53.1188072  17.32411806 23.78100634 51.00530142 94.29996265  0.
16.79865262 40.09188132  0.          0.          0.          0.
 0.          44.2659287  81.33532107  0.          0.          51.30093824
 0.          0.          0.          23.9359171  84.31592084 20.50535374
27.14210009 67.6350893  51.57485504  0.          52.51057155  0.
 0.          84.43931057 45.99585314  0.          94.74691382 21.76302404
79.71560898 60.22125674 51.48440648  0.          57.70195081  0.
87.06483951  0.          0.          0.          0.          27.05458568
 0.          0.          62.74540599 84.99768949 12.65063437  0.
 0.          78.10031116 12.36984167  0.          0.          94.87596965
23.8276587  0.          74.46230527 71.8201786  34.43516973 69.15775504
 0.          0.          20.06689065 53.27647632  0.          87.30893091
98.15521838  0.          16.50894329  0.          87.45786772 10.80057545
 0.          29.01748093 96.33804603 14.08985214 15.8124834  0.
 0.          39.2364204  0.          15.21752016  0.          59.60591952
 0.          77.40510804 47.69078473 94.01709959  0.          94.89747153
 0.          88.67179722  0.          26.98408993 90.82168319 33.02263029
99.50185549  0.          91.08122757 32.07958971 40.92959042 28.8883734
62.42987664  0.          0.          0.          19.76019909 35.64348697
22.37097913  0.          0.          94.58765453 98.12146783 13.36107129
33.06959676 16.75865101 43.0855351 99.7662452 53.71640308  0.
 0.          0.          0.          74.45675259  0.          31.9520907
 0.          78.2602065  54.65077191  0.          83.15696508 26.1264527
94.20933986  0.          59.58190954 76.83394348 36.69733083 41.56526088
 0.          98.4432468  91.13137575  0.          0.          0.
 0.          0.          69.07170799  0.          42.21453086  0.
78.69918168 60.23357113 56.9671791  0.          63.78610449 67.84014216
 0.          17.86990929  0.          42.5351707  0.          0.
65.21390112 70.58839651 35.99645712 79.93377584  0.          90.02279485
 0.          22.87912953  0.          0.          11.81848441 21.18035786
 0.          41.59511133  0.          0.          0.          41.76507689
39.51768724 55.87996564 66.90017977 37.50083763 42.74669708 20.93605975
15.65357482 96.03451991  0.          72.89879306 61.83025293  0.
47.60916691 55.22714395 20.20287039  0.          39.75867496  0.
 0.          0.          37.90430474 37.42499246 92.31270193  0.
88.54415294  0.          33.02874499 21.08449472 68.1184453  67.57682098
 0.          0.          ]
```

In [68]:

```
# 绘制累积收益曲线
cumulative_returns_plot(['Portfolio', 'Portfolio_EW', 'Portfolio_GMV', 'Portfolio_MSR'])
```

</div>

<div class="prompt"></div>



In [88]:

```
proportion = pd.DataFrame()  
#proportion.reset_index()  
proportion[company_list] = MSR_weights  
proportion.loc['MSR'] = MSR_weights  
proportion.loc['GMV'] = GMV_weights  
proportion
```

</div>

<div class="prompt output_prompt">Out[88]:</div>

```
.dataframe tbody tr th {  
    vertical-align: top;  
}  
  
.dataframe thead th {  
    text-align: right;  
}
```

	E124	E125	E126	E127	E128	E129	E130	E131	E132	E133	...	E416	E417	E418
MSR	0.0	0.0	0.00725	0.001345	0.0	0.000000	0.005152	0.0	0.007571	0.002337	...	0.009231	0.0	0.008854
GMV	0.0	0.0	0.00000	0.000000	0.0	0.005177	0.000000	0.0	0.006771	0.000000	...	0.000000	0.0	0.000000

2 rows × 302 columns

In []:

</div>