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        "# Splits at space\n",
        "s.split()"
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        "data": {
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          ]
        },
        "metadata": {},
        "execution_count": 2
      }
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      "## 2. Use .format() to print the following string. \n",
      "\n",
      "### Output should be: The diameter of Earth is 12742 kilometers."
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      "planet = \"Earth\"\n",
      "diameter = 12742"
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      "# Reverse the index numbers with the\n",
      "# parameters of the placeholders\n",
      "'The diameter of {0} is {1} kilometer'.format(planet,diameter)"
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        "data": {
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            "'The diameter of Earth is 12742 kilometer'"
          ]
        }
      ]
    ]
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]

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        }
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    "source": [
        "d = {'k1':[1,2,3,{'tricky':['oh','man','inception',{'target':
[1,2,3,'hello']}]})}"
    ],
    "metadata": {
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    },
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        "#In this nest dictionary grabing the word \"hello\\n\",
        "print(d[\"k1\"][3][\"tricky\"][3][\"target\"][3])"
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        {
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            "name": "stdout",
            "text": [
                "hello\\n"
            ]
        }
    ]
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        "## 4.2 Create an array of 10 fives?"
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    }
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        "array1=np.zeros(10)\n",
        "print(array1)"
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            ]
        }
    ]
},
{
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        "# array of 10 fives\n",
        "array2=np.ones(10)*5\n",
        "print(array2)"
    ],
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        "array3=np.arange(20,36,2)\n",
        "print(array3) "
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            ]
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    "x = np.arange(0, 9).reshape(3,3)\n",
    "print(x)"
  ],
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      "name": "stdout",
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        " [3 4 5]\n",
        " [6 7 8]]\n"
      ]
    }
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    "## 7. Concatenate a and b \n",
    "## a = np.array([1, 2, 3]), b = np.array([4, 5, 6])"
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    "a = np.array([1, 2, 3])\n",
    "b = np.array([4, 5, 6])\n",
    "#Concatenate \n",
    "np.concatenate((a,b),axis=None)"
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        "array([1, 2, 3, 4, 5, 6])"
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        "A = np.random.randint(10, size=(3,2))\n",
        "#dataframe\n",
        "df = pd.DataFrame(A,columns=['cola', 'colb'])\n",
        "df"
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          "1      5     5\n",
          "2      2     2"
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          "          .dataframe tbody tr th:only-of-type {\n",
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          "\n",
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          "          }\n",
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          "      <th>colb</th>\n",
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"      <button class=\"colab-df-convert\"
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table.\"\\n\",
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2.06.94zm10 10l.94 2.06.94-2.06 2.06-.94-2.06-.94-.94-2.06-.94
2.06-2.06.94z\"/><path d=\"M17.41 7.96l-1.37-1.37c-.4-.4-.92-.59-1.43-.59-.52 0-
1.04.2-1.43.59L10.3 9.45l-7.72 7.72c-.78.78-.78 2.05 0 2.83L4 21.41c.39.39.9.59
1.41.59.51 0 1.02-.2 1.41-.59l7.78-7.78 2.81-2.81c.8-.78.8-2.07 0-2.86zM5.41 20L4
18.59l7.72-7.72 1.47 1.35L5.41 20z\"/>\\n\",
"    </svg>\\n\",
"    </button>\\n\",
"    \\n\",
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"      }\\n\",
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"\\n\",
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"        fill: #FFFFFF;\\n\",
"      }\\n\",
"    </style>\\n\",
"\\n\",

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```

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        "    document.querySelector('#df-710b8382-7ad4-4a2d-ae18-813116e562ea button.colab-df-convert');\n",
        "    buttonEl.style.display =\n",
        "    google.colab.kernel.accessAllowed ? 'block' : 'none';\n",
        "\n",
        "    async function convertToInteractive(key) {\n",
        "    const element = document.querySelector('#df-710b8382-7ad4-4a2d-ae18-813116e562ea');\n",
        "    const dataTable =\n",
        "    await
google.colab.kernel.invokeFunction('convertToInteractive',\n",
        "    [key], {});\n",
        "    if (!dataTable) return;\n",
        "\n",
        "    const docLinkHtml = 'Like what you see? Visit the ' +\n",
        "    '<a target=\"_blank\" href=https://colab.research.google.com/notebooks/data_table.ipynb>data table notebook</a>'\n",
        "    + ' to learn more about interactive tables.';\n",
        "    element.innerHTML = '';\n",
        "    dataTable['output_type'] = 'display_data';\n",
        "    await google.colab.output.renderOutput(dataTable, element);\n",
        "    const docLink = document.createElement('div');\n",
        "    docLink.innerHTML = docLinkHtml;\n",
        "    element.appendChild(docLink);\n",
        "    }\n",
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        "</div>\n",
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    "    'col_a': [1,2,3], \n",
    "    'col_b': [2,5,6], \n",
    "}\n",
    "#dataframe\n",
    "df = pd.DataFrame(dict_a)\n",
    "df"
  ]
}

```

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        "0      1      2\n",
        "1      2      5\n",
        "2      3      6"
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        "      <div>\n",
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        "          .dataframe tbody tr th:only-of-type {\n",
        "            vertical-align: middle;\n",
        "          }\n",
        "          .dataframe tbody tr th {\n",
        "            vertical-align: top;\n",
        "          }\n",
        "          .dataframe thead th {\n",
        "            text-align: right;\n",
        "          }\n",
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table.\"\\n\",
"      style=\"display:none;\">\n",
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2.06.94zm10 10l1.94 2.06.94-2.06 2.06-.94-2.06-.94-.94-2.06-.94
2.06-2.06.94z\"/><path d=\"M17.41 7.96l-1.37-1.37c-.4-.4-.92-.59-1.43-.59-.52 0-
1.04.2-1.43.59L10.3 9.45l-7.72 7.72c-.78.78-.78 2.05 0 2.83L4 21.41c.39.39.9.59
1.41.59.51 0 1.02-.2 1.41-.59l7.78-7.78 2.81-2.81c.8-.78.8-2.07 0-2.86zM5.41 20L4
18.59l7.72-7.72 1.47 1.35L5.41 20z\"/>\n\",
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"      padding: 0 0 0 0;\n\",
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"    }\n\",
"\\n\",
"    .colab-df-convert:hover {\n\",
"      background-color: #E2EBFA;\n\",
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rgba(60, 64, 67, 0.15);\n\",
"      fill: #174EA6;\n\",
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"      box-shadow: 0px 1px 3px 1px rgba(0, 0, 0, 0.15);\n",
"      filter: drop-shadow(0px 1px 2px rgba(0, 0, 0, 0.3));\n",
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"      document.querySelector('#df-eaf6c25c-1330-4cb2-ab36-4419dc9e4e0d button.colab-df-convert');\n",
"      buttonEl.style.display =\n",
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"      [key], {});\n",
"      if (!dataTable) return;\n",
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"      element.innerHTML = '';\n",
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2.06-2.06.94z\"/><path d=\"M17.41 7.96l-1.37-1.37c-.4-.4-.92-.59-1.43-.59-.52 0-
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        "          google.colab.kernel.invokeFunction('convertToInteractive',\n",
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        "        if (!dataTable) return;\n",
        "\n",
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        "          '<a target=\"_blank\" href=https://colab.research.google.com/notebooks/data_table.ipynb>data table notebook</a>'\n",
        "          + ' to learn more about interactive tables.';\n",
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    "df['time'] = pd.date_range(start=\"1/1/2023\",end=\"2/10/2023\", freq
='24H')\n",
    "  # print dataframe\n",
    "  \n",
    "# Extract features - year, month, day, hour, and minute\n",
    "df['year'] = df['time'].dt.year\n",
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    "df.head(len(df[\"time\"])))"
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"         <td>2023</td>\n",
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"         <td>2</td>\n",
"         <td>10</td>\n",
"     </tr>\n",
" </tbody>\n",
"</table>\n",
"</div>\n",
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onclick=\"convertToInteractive('df-5ffea3b0-d3fb-4993-b0df-8086a405ad62')\">\n",
"         title=\"Convert this dataframe to an interactive
table.\">\n",
"         style=\"display:none;>\n",
"         \n",
"     <svg xmlns=\"http://www.w3.org/2000/svg\"
height=\"24px\" viewBox=\"0 0 24 24\">\n",
"         width=\"24px\">\n",

```

```

"      <path d=\"M0 0h24v24H0V0z\" fill=\"none\"/>\n",
"      <path d=\"M18.56 5.44l.94 2.06.94-2.06 2.06-.94-2.06-.94-.94-
2.06-.94 2.06-2.06.94zm-11 1L8.5 8.5l.94-2.06 2.06-.94-2.06-.94L8.5 2.5l-.94 2.06-
2.06.94zm10 10l.94 2.06.94-2.06 2.06-.94-2.06-.94-.94-2.06-.94
2.06-2.06.94z\"/><path d=\"M17.41 7.96l-1.37-1.37c-.4-.4-.92-.59-1.43-.59-.52 0-
1.04.2-1.43.59L10.3 9.45l-7.72 7.72c-.78.78-.78 2.05 0 2.83L4 21.41c.39.39.9.59
1.41.59.51 0 1.02-.2 1.41-.59L17.78-7.78 2.81-2.81c.8-.78.8-2.07 0-2.86zM5.41 20L4
18.59l7.72-7.72 1.47 1.35L5.41 20z\"/>\n",
"    </svg>\n",
"    </button>\n",
"    \n",
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"        display: flex;\n",
"        flex-wrap: wrap;\n",
"        gap: 12px;\n",
"      }\n",
"\n",
"      .colab-df-convert {\n",
"        background-color: #E8F0FE;\n",
"        border: none;\n",
"        border-radius: 50%;\n",
"        cursor: pointer;\n",
"        display: none;\n",
"        fill: #1967D2;\n",
"        height: 32px;\n",
"        padding: 0 0 0 0;\n",
"        width: 32px;\n",
"      }\n",
"\n",
"      .colab-df-convert:hover {\n",
"        background-color: #E2EBFA;\n",
"        box-shadow: 0px 1px 2px rgba(60, 64, 67, 0.3), 0px 1px 3px 1px
rgba(60, 64, 67, 0.15);\n",
"        fill: #174EA6;\n",
"      }\n",
"\n",
"      [theme=dark] .colab-df-convert {\n",
"        background-color: #3B4455;\n",
"        fill: #D2E3FC;\n",
"      }\n",
"\n",
"      [theme=dark] .colab-df-convert:hover {\n",
"        background-color: #434B5C;\n",
"        box-shadow: 0px 1px 3px 1px rgba(0, 0, 0, 0.15);\n",
"        filter: drop-shadow(0px 1px 2px rgba(0, 0, 0, 0.3));\n",
"        fill: #FFFFFF;\n",
"      }\n",
"    </style>\n",
"\n",
"    <script>\n",
"      const buttonEl =\n",
"        document.querySelector('#df-5ffea3b0-d3fb-4993-b0df-
8086a405ad62 button.colab-df-convert');\n",
"      buttonEl.style.display =\n",
"        google.colab.kernel.accessAllowed ? 'block' : 'none';\n",
"\n",
"      async function convertToInteractive(key) {\n",
"        const element = document.querySelector('#df-5ffea3b0-d3fb-

```



```

4993-b0df-8086a405ad62');\n",
    "        const dataTable = \n",
    "        await
google.colab.kernel.invokeFunction('convertToInteractive',\n",
    "        [key], {});\n",
    "        if (!dataTable) return;\n",
    "\n",
    "        const docLinkHtml = 'Like what you see? Visit the ' +\n",
    "        '<a target=\"_blank\"
href=https://colab.research.google.com/notebooks/data_table.ipynb>data table
notebook</a>\n",
    "        + ' to learn more about interactive tables.';\n",
    "        element.innerHTML = '';\n",
    "        dataTable['output_type'] = 'display_data';\n",
    "        await google.colab.output.renderOutput(dataTable,
element);\n",
    "        const docLink = document.createElement('div');\n",
    "        docLink.innerHTML = docLinkHtml;\n",
    "        element.appendChild(docLink);\n",
    "    }\n",
    "    </script>\n",
    "    </div>\n",
    "    </div>\n",
    "    "
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    "## 10. Create 2D list to DataFrame\n",
    "\n",
    "lists = [[1, 'aaa', 22],\n",
    "          [2, 'bbb', 25],\n",
    "          [3, 'ccc', 24]]"
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```

```

"df = pd.DataFrame(lists, columns =['col1','col2','col3']) \n",
"df"
],
"metadata": {
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  "colab": {
    "base_uri": "https://localhost:8080/",
    "height": 143
  },
  "outputId": "a5f2f164-791b-4a7e-edda-0beaf40dddf"
},
"execution_count": 19,
"outputs": [
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    "output_type": "execute_result",
    "data": {
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        "   col1 col2 col3\n",
        "0      1  aaa   22\n",
        "1      2  bbb   25\n",
        "2      3  ccc   24"
      ],
      "text/html": [
        "\n",
        "  <div id=\"df-5486a87f-40d0-49bd-8fe1-40ca2559ff4f\">\n",
        "    <div class=\"colab-df-container\">\n",
        "      <div>\n",
        "        <style scoped>\n",
        "          .dataframe tbody tr th:only-of-type {\n",
        "            vertical-align: middle;\n",
        "          }\n",
        "\n",
        "          .dataframe tbody tr th {\n",
        "            vertical-align: top;\n",
        "          }\n",
        "\n",
        "          .dataframe thead th {\n",
        "            text-align: right;\n",
        "          }\n",
        "</style>\n",
        "<table border=\"1\" class=\"dataframe\">\n",
        "  <thead>\n",
        "    <tr style=\"text-align: right;\">\n",
        "      <th></th>\n",
        "      <th>col1</th>\n",
        "      <th>col2</th>\n",
        "      <th>col3</th>\n",
        "    </tr>\n",
        "  </thead>\n",
        "  <tbody>\n",
        "    <tr>\n",
        "      <th>0</th>\n",
        "      <td>1</td>\n",
        "      <td>aaa</td>\n",
        "      <td>22</td>\n",
        "    </tr>\n",
        "    <tr>\n",
        "      <th>1</th>\n",
        "      <td>2</td>\n",

```

```

"         <td>bbb</td>\n",
"         <td>25</td>\n",
"       </tr>\n",
"     <tr>\n",
"       <th>2</th>\n",
"       <td>3</td>\n",
"       <td>ccc</td>\n",
"       <td>24</td>\n",
"     </tr>\n",
"   </tbody>\n",
"</table>\n",
"</div>\n",
"   <button class=\"colab-df-convert\"
onclick=\"convertToInteractive('df-5486a87f-40d0-49bd-8fe1-40ca2559ff4f')\"\\n\",
"       title=\"Convert this dataframe to an interactive
table.\"\\n\",
"       style=\"display:none;\">\n",
"     \n",
"   <svg xmlns=\"http://www.w3.org/2000/svg\"
height=\"24px\" viewBox=\"0 0 24 24\"\\n\",
"     width=\"24px\">\n",
"     <path d=\"M0 0h24v24H0V0z\" fill=\"none\"/>\n",
"     <path d=\"M18.56 5.44l1.94 2.06.94-2.06-.94-.94-
2.06-.94 2.06-2.06.94zm-11 1L8.5 8.5l1.94-2.06 2.06-.94-2.06-.94L8.5 2.51-.94 2.06-
2.06.94zm10 10l1.94 2.06 2.06-.94-2.06-.94-.94-2.06-.94
2.06-2.06.94z\"/><path d=\"M17.41 7.96l-1.37-1.37c-.4-.4-.92-.59-1.43-.59-.52 0-
1.04.2-1.43.59L10.3 9.45l-7.72 7.72c-.78.78-.78 2.05 0 2.83L4 21.41c.39.39.9.59
1.41.59.51 0 1.02-.2 1.41-.59l7.78-7.78 2.81-2.81c.8-.78.8-2.07 0-2.86zM5.41 20L4
18.59l7.72-7.72 1.47 1.35L5.41 20z\"/>\n",
"   </svg>\n",
" </button>\n",
" \n",
" <style>\n",
"   .colab-df-container {\n",
"     display: flex;\n",
"     flex-wrap: wrap;\n",
"     gap: 12px;\n",
"   }\n",
" \n",
"   .colab-df-convert {\n",
"     background-color: #E8F0FE;\n",
"     border: none;\n",
"     border-radius: 50%;\n",
"     cursor: pointer;\n",
"     display: none;\n",
"     fill: #1967D2;\n",
"     height: 32px;\n",
"     padding: 0 0 0 0;\n",
"     width: 32px;\n",
"   }\n",
" \n",
"   .colab-df-convert:hover {\n",
"     background-color: #E2EBFA;\n",
"     box-shadow: 0px 1px 2px rgba(60, 64, 67, 0.3), 0px 1px 3px 1px
rgba(60, 64, 67, 0.15);\n",
"     fill: #174EA6;\n",
"   }\n",
" \n",
"   [theme=dark] .colab-df-convert {\n",

```

```

"      background-color: #3B4455;\n",
"      fill: #D2E3FC;\n",
"    }\n",
"\n",
"    [theme=dark] .colab-df-convert:hover {\n",
"      background-color: #434B5C;\n",
"      box-shadow: 0px 1px 3px 1px rgba(0, 0, 0, 0.15);\n",
"      filter: drop-shadow(0px 1px 2px rgba(0, 0, 0, 0.3));\n",
"      fill: #FFFFFF;\n",
"    }\n",
"  </style>\n",
"\n",
"    <script>\n",
"      const buttonEl =\n",
"      document.querySelector('#df-5486a87f-40d0-49bd-8fe1-40ca2559ff4f button.colab-df-convert');\n",
"      buttonEl.style.display =\n",
"      google.colab.kernel.accessAllowed ? 'block' : 'none';\n",
"\n",
"      async function convertToInteractive(key) {\n",
"      const element = document.querySelector('#df-5486a87f-40d0-49bd-8fe1-40ca2559ff4f');\n",
"      const dataTable =\n",
"      await\n",
"      google.colab.kernel.invokeFunction('convertToInteractive',\n",
"      [key], {});\n",
"      if (!dataTable) return;\n",
"\n",
"      const docLinkHtml = 'Like what you see? Visit the ' +\n",
"      '<a target=\"_blank\" href=https://colab.research.google.com/notebooks/data_table.ipynb>data table notebook</a>'\n",
"      + ' to learn more about interactive tables.';\n",
"      element.innerHTML = '';\n",
"      dataTable['output_type'] = 'display_data';\n",
"      await google.colab.output.renderOutput(dataTable,\n",
"      element);\n",
"      const docLink = document.createElement('div');\n",
"      docLink.innerHTML = docLinkHtml;\n",
"      element.appendChild(docLink);\n",
"    }\n",
"  </script>\n",
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