

```

{
  "nbformat": 4,
  "nbformat_minor": 0,
  "metadata": {
    "colab": {
      "provenance": [],
      "collapsed_sections": []
    },
    "kernelspec": {
      "name": "python3",
      "display_name": "Python 3"
    },
    "language_info": {
      "name": "python"
    }
  },
  "cells": [
    {
      "cell_type": "code",
      "execution_count": 16,
      "metadata": {
        "id": "7qH4ytjhYAQ1"
      },
      "outputs": [],
      "source": [
        "import numpy as np\n",
        "import pandas as pd\n",
        "import matplotlib.pyplot as plt\n",
        "from keras.utils import np_utils\n",
        "from tensorflow.keras.datasets import mnist\n",
        "from tensorflow.keras.models import Sequential\n",
        "from tensorflow.keras.layers import Conv2D, Dense, Flatten\n",
        "from tensorflow.keras.optimizers import Adam\n",
        "from tensorflow.keras.models import load_model\n",
        "from PIL import Image, ImageOps\n",
        "import numpy"
      ]
    },
    {
      "cell_type": "code",
      "source": [
        "(X_train, y_train), (X_test, y_test) = mnist.load_data()"
      ],
      "metadata": {
        "colab": {
          "base_uri": "https://localhost:8080/"
        },
        "id": "gUdmB_92YoFH",
        "outputId": "eee7642f-02c9-44d5-da76-4ddcfade53b6"
      },
      "execution_count": 2,
      "outputs": [
        {
          "output_type": "stream",
          "name": "stdout",

```

```
[{"text": ["Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/mnist.npz\n", "11490434/11490434 [=====] - 0s 0us/step\n"], {"cell_type": "code", "source": ["print(X_train.shape)\n", "print(X_test.shape)"], "metadata": {"colab": {"base_uri": "https://localhost:8080/"}, "id": "b7xucUezYsTs", "outputId": "6176c8b6-7734-4fa4-8163-141064190f6e"}, "execution_count": 3, "outputs": [{"output_type": "stream", "name": "stdout", "text": ["(60000, 28, 28)\n", "(10000, 28, 28)\n"]}], {"cell_type": "code", "source": ["X_train[0]"], "metadata": {"colab": {"base_uri": "https://localhost:8080/"}, "id": "78T8SsyqYtxg", "outputId": "43f06a41-9594-4d28-f4fc-705b4ac6ce28"}, "execution_count": 4, "outputs": [{"output_type": "execute_result", "data": {"text/plain": ["array([[ 0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,\n          0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,\n          0,  0],\n       [\n    [ 0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,\n      0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,\n      0,  0]
```

```

"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 3,\n",
"    18, 18, 18, 126, 136, 175, 26, 166, 255, 247, 127, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 30, 36, 94, 154, 170,\n",
"    253, 253, 253, 253, 253, 225, 172, 253, 242, 195, 64, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 49, 238, 253, 253, 253, 253,\n",
"    253, 253, 253, 253, 251, 93, 82, 82, 56, 39, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 18, 219, 253, 253, 253, 253,\n",
"    253, 198, 182, 247, 241, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 80, 156, 107, 253, 253,\n",
"    205, 11, 0, 43, 154, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 14, 1, 154, 253,\n",
"    90, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 139, 253,\n",
"    190, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 11, 190,\n",
"    253, 70, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 35,\n",
"    241, 225, 160, 108, 1, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    81, 240, 253, 253, 119, 25, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 45, 186, 253, 253, 150, 27, 0, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0, 16, 93, 252, 253, 187, 0, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0, 0, 0, 249, 253, 249, 64, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 46, 130, 183, 253, 253, 207, 2, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 39,\n",
"    148, 229, 253, 253, 253, 250, 182, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",

```

```

"    [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 24, 114, 221,\n",
"    253, 253, 253, 253, 201, 78, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 23, 66, 213, 253, 253,\n",
"    253, 253, 198, 81, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 18, 171, 219, 253, 253, 253, 253,\n",
"    195, 80, 9, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 55, 172, 226, 253, 253, 253, 253, 244, 133,\n",
"    11, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 136, 253, 253, 253, 212, 135, 132, 16, 0,\n",
"    0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0],\n",
"    [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,\n",
"    0, 0]], dtype=uint8)"
]
},
"metadata": {},
"execution_count": 4
}
]
},
{
"cell_type": "code",
"source": [
"y_train[0]"
],
"metadata": {
"colab": {
"base_uri": "https://localhost:8080/"
},
"id": "CtTPs__TYxS3",
"outputId": "bfb793cd-dca2-4af1-e6d9-dfa6b730a949"
},
"execution_count": 5,
"outputs": [
{
"output_type": "execute_result",
"data": {
"text/plain": [
"5"
]
},
},
"metadata": {},
"execution_count": 5
}
}

```

```
]
},
{
  "cell_type": "code",
  "source": [
    "plt.imshow(X_train[0])"
  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/",
      "height": 282
    },
    "id": "TX3f7DyhY2Yg",
    "outputId": "3f5a0d5e-0620-414c-c243-2abfa3fdaea1"
  },
  "execution_count": 6,
  "outputs": [
    {
      "output_type": "execute_result",
      "data": {
        "text/plain": [
          "<matplotlib.image.AxesImage at 0x7fc4986466d0>"
        ]
      },
      "metadata": {},
      "execution_count": 6
    },
    {
      "output_type": "display_data",
      "data": {
        "text/plain": [
          "<Figure size 432x288 with 1 Axes>"
        ],
        "image/png": "iVBORw0KGgoAAAANSUhEUgAAAPsAAAD4CAYAAAAAq5pAIAAAABHNCSVQICA  
gIfAhkIAAAAAAwSFlzAAALEgAACxIB0t1+/AAAADh0RVh0U29mdHdhcmUAAbWF0cGxvdGxpYiB2ZXJzaW9u  
uMy4yLjIsIGh0dHA6Ly9tYXRwbG90bGliLm9yZy+WH4yJAAAOZ0IEQVR4nO3dbYxc5XnG8euKbezamMQbB  
9chLjjgFAg0Jl0ZEBZQobgOqgSoCsSKIkJpnSY4Ca0rQWIV3IpWbpUQUUqRTHEXFS+BBIQ/0CTUQpCowWW  
hBgwEDMY0NmaNWYENIX5Z3/2w42iBnWeXmTMv3vv/k1Yzc+45c24NXD5nznNmHkeEAIx/H+p0AwDag7A  
DSRB2IAnCDiRB2IEkRzZY4d5ckzRtHZuEkjIV3pbe2OPR6o1FXbbiyVdJ2mCpH+LiJWl50/RNJ3qc5rZJICC9bG  
ubq3hw3jbEyTdIONzkk6UtMT2iY2+HoDWauYZ+wJJL0TE5ojYK+IOSedV0xaAqjUT9qMk/WLY4621Ze9ie6ntPt  
t9+7Snic0BaEbLz8ZHxKqI6l2I3kma3OrNAaijmbBvkzRn2ONP1JYB6ELNhP1RSfNsZ7V9mKQvSlpbTVsAqtbw0  
FtE7Le9TNKPNDT0tjoinq6sMwCVamqcPSLul3R/Rb0AaCEulwWSIOxAEoQdSIKwA0kQdiAJwg4kQdiBJAg7k  
ARhB5Ig7EAShB1IgrADSRB2IAnCDiRB2IEkCDuQBGEHkiDsQBKEHUICsANJEHYgCcIOJEHYgSQIO5AEY  
QeSIOxAEoQdSIKwA0kQdiCJpmZxRffzPJ/4gkfm9nS7T/3F8fUrQ1OPVBc9+hjdxTrU7/uYv3Vaw+rW3u893vF  
dXcOvl2sn3r38mL9uD9/pFjvhKbCbnuLpN2SBiXtj4jeKpoCUL0q9uy/FxE7K3gdAC3EZ3YgiWbDHPJ+bPsx20tH  
eoLtpbb7bPft054mNwegUc0exi+MiG22j5T0gO2fR8TDw58QEaskrZKki9wTTW4PQIOa2rNHxLba7Q5J90paUE  
VTAKrXcNhtT7M9/eB9SYskbayqMQDVauYwfpake20ffj3bI+KHlXQ1zkW4YV6xHpMnFeuVnPWRYv2d0+qPCf  
d8uDxe/JPPIMebO+k/fzm9WP/Hf1lcrK8/+fa6tZf2vVNcd2X/54r1j//k0PtE2nDYI2KzpM9U2AuAFmLoDUiCsANJ  
EHYgCcIOJEHYgST4imsFBs/+bLF+7S03FOufmlT/q5jj2b4YLNb/5vqvFOsT3y4Pf51+97K6tenb9hfXnbyzPDQ3t  
W99sd6N2LMDSRB2IAnCDiRB2IEkCDuQBGEHkiDsQBKMs1dg8nOvFOuP/WpOsf6pSflVtlOp5dtPK9Y3v1X  
+Kepbjv1+3dqB8rj5LP++b+L9VY69L7AOjr27EAShB1IgrADSRB2IAnCDiRB2IEkCDuQhCPaN6J4hHviVJ/Ttu  
11i4FLTl/Wdy0u/9zzhCcPL9af+Pr1H7ing67Z+TvF+qNnlcfRB994s1iP0+v/APGWbxZX1dwlT5SfgPdZH+u0KwZ  
GnMuaPTuQBGEHkiDsQBKEHUICsANJEHYgCcIOJME4exeYMPOjxfrg6wPF+ku31x8rf/rM1cV1F/zDN4r1I2/o  
3HfK8cE1Nc5ue7XtHbY3DlvWY/sB25tqtzOqbBhA9cZyGH+LpPfOen+lpHURMU/SutpjAF1s1LBHxMOS3nsce  
Z6kNbX7aySdX3FfACrW6G/QzYq17bX7r0qaVe+JtpdKWipJUzS1wc0BaFbTZ+Nj6Axf3bN8EbEqInojoneSJje7O
```

QANajTs/bZnS1Ltdkd1LQFohUbDvIbSxbX7F0u6r5p2ALTkqJ/Zbd8h6WxJM21v1XS1pJWS7rJ9qaSXJV3YyibH  
u8Gdrze1/r5djcv/ukvPVOsv3bjhPILHCjPsY7uMWYrYI2JJnRJXxwCHEC6XBZlG7EAShB1IgrADSRB2IAmmbB4  
HTrji+bq1S04uD5r8+9HrivWzvnBZsT79e48U6+ge7NmBJAg7kARhB5Ig7EAShB1IgrADSRB2IANG2ceB0rTJr3/  
thOK6/7f2nWL9ymtuLdb/8sILivX43w/Xrc35+58V11UbF+Y8A/bsQBKEHUiCsANJEHYgCcIOJEHYgSQIO5AE  
UzYnN/BHpxfirt1397WJ97sQpDW/707cuK9bn3bS9WN+/eUvD2x6vmpqyGcD4QNiBJAg7kARhB5Ig7EAShB1Ig  
rADSTDOjqI4Y36xfsTKrcX6HZ/8UcPbPv7BPy7Wf/tv63+PX5IGN21ueNuHqqbG2W2vtr3D9sZhy1bY3mZ7Q+3  
v3CobBIC9sRzG3yJp8QJLvxsR82t/91fbFoCqjRr2iHhY0kAbegHQQs2coFtm+8naYf6Mek+yvdR2n+2+fdrTxOYA  
NKPRsN8o6VhJ8yVtl/Sdek+MiFUR0RsRvZM0ucHNAWhWQ2GPiP6IGlyIA5JukrSg2rYAVK2hsNuePezhBZI21  
nsugO4w6ji77TsknS1ppqR+SVfXHs+XFJK2SPpqRJS/fCzG2cejCbOOLNZfuei4urX1V1xXXPdDo+yLvVTSomL9  
zYWvF+vJUWmcfdrJLiJiyQiLb266KwBtxeWyQBKEHUiCsANJEHYgCcIOJMFXXNExd20tT9k81YcV67+Mvc  
X6H3zj8vqvfe/64rqHKn5KGGbBhB7Ig7EAShB1IgrADSRB2IANCDiQx6rfekNuBheWfkn7xC+Upm0+av6VubBRx  
9NFcP3BKsT71vr6mXn+8Yc8OJEHYgSQIO5AEYQeSIOxAEoQdSIKwA0kwzj7OufekYv35b5bHum86Y02xfua  
U8nfKm7En9hXrjwzMLb/AgVF/3TwV9uxAEoQdSIKwA0kQdiAJwg4kQdiBJAg7kATj7IeAiXOPLtZfvOTjdWsr  
LrqzuO4fHr6zoZ6qcFV/b7H+0HWnFesz1pR/dx7vNuqe3fYc2w/afsb207a/VVveY/sB25tqtzNa3y6ARo3IMH6/pO  
URcaKk0yRdZvtESvDKWhcR8yStqz0G0KVGDXtEbl+Ix2v3d0t6VtJRks6TdpBayjWSzm9VkwCa94E+s9s+RtIpk  
tZLmhURBy8+fIXSrDrrLJW0VJKmaGqjFQJo0pjPxts+XNIPJF0eEbuG12JodsgRZ4iMiFUR0RsRvZM0ualmATRu  
TGG3PUIDQb8tlU6pLe63PbtWny1pR2taBFCFUQ/jbVvSzZKejYhrh5XWSrpY0sra7X0t6XAcMhJmBxXrb/7u7GL  
9or/7YbH+px+5p1hvpExby8NjP/vX+sNrPbf8T3HdGQcYWqvSWD6znyHpy5Kesr2htuwqDYX8LtuXSnPZ0oWta  
RFAFUYN0T8VNKIk7tLOqfadgC0CpflAKkQdiAJwg4kQdiBJAg7kARfcr2jibN/s25tYPW04rpfm/tQsb5ken9DP  
VVh2baFxfjN5anbJ75/Y3Fes9uxsq7BXt2IANCDiRB2IEkCDuQBGEHkiDsQBKEHUgizTj73t8v/2zx3j8bKNavOu  
7+urVFv/F2Qz1VpX/wnbq1M9cuL657/F//vFjveaM8Tn6gWEU3Yc8OJEHYgSQIO5AEYQeSIOxAEoQdSIKwA0  
mkGWffcn7537XnT767Zdu+4Y1ji/XrHlpUrHuw3o/7Djn+mpfq1ub1ry+uO1isYjxhzw4kQdiBJAg7kARhB5Ig7EA  
ShB1IgrADSTgiyk+w50i6VdIsSSFpVURcZ3uFpD+R9FrtqVdFRP0vfUs6wj1xqpn4FWiV9bFOu2JgxASzxnJRzX5  
JyyPicdvTJT1m+4Fa7bsR8e2qGgXQOmOZn327pO21+7ttPyvpqFY3BqBaH+gzu+1jJJ0i6eA1mMtsP217te0ZddZZ  
arvPdt8+7WmqWQCNG3PYbR8u6QeSLo+IXZJulHSSpPka2vN/Z6T1ImJVRPRGRO8kTa6gZQCNGFPYbU/SUN  
Bvi4h7JCKi+iNiMCIOslpJ0oLWtQmgWaOG3bYl3Szp2Yi4dtjy2cOedoGk8nSeADpqLGfjz5D0ZUIP2d5QW3aV  
pCW252toOG6LpK+2pEMAIrjL2fifShpp3K44pg6gu3AFHZAeYQeSIOxAEoQdSIKwA0kQdiAJwg4kQdiBJAg7  
kARhB5Ig7EAShB1IgrADSRB2IIIRf0q60o3Zr0l6ediimZJ2tq2BD6Zbe+vWviR6a1SVvR0dER8bqdDWsL9v43Zf  
RPR2rIGCbU2tW/uS6K1R7eqNw3ggCcIOJNHpsK/q8PZLurW3bu1LordGtaW3jn5mB9A+nd6zA2gTwg4k0ZGw2  
15s+znbl9i+shM91GN7i+2nbG+w3dfhXlbb3mF747BIPbYfsL2pdjviHHsd6m2F7W21926D7XM71Nsc2w/afsb20  
7a/VVve0feu0Fdb3re2f2a3PUHS85I+J2mrpEclLYmIZ9raSB22t0jqjYiOX4Bh+0xJb0m6NSJOqi37J0kDEbGy9g/ljI  
i4okt6WyHprU5P412brWj28GnGJZ0v6Svq4HtX6OtCteF968SefYgkFyJic0TslXSnPm60EfXi4iHJQ28Z/F5ktbU  
7q/R0P8sbVent64QEdsj4vHa/d2SDk4z3tH3rtBXW3Qi7EdJ+sWwx1vVXf09h6Qf237M9tJONzOCWRGxvXb/VU  
mzOtnMCEadxrud3jPNeNe8d41Mf94sTtC938KI+KyKz0u6rHa42pVi6DNYN42djmkA73YZYZrxX+vke9fo9OfN6  
kTYt0maM+zxJ2rLukJEBKvd7pB0r7pvKur+gzPolm53dLifX+umabxHmZcXfDedXL6806E/VFJ82zPtX2YpC9  
KWtuBPt7H9rTaiRPZniZpkbpvKuq1ki6u3b9Y0n0d7OVdumUa73rTjKvD713Hpz+PiLb/STpXQ2fkX5T0V53ooU  
5fn5T0RO3v6U73JukODR3W7dPQuY1LJX1U0jpJmyT9l6SeLurtPyQ9JelJDQVrdod6W6ihQ/QnJW2o/Z3b6feu0F  
db3jculwWS4AQdkARhB5Ig7EAShB1IgrADSRB2IANCDiTx/65XcTNOWsh5AAAAAEIFTkSuQmCC\n"

```
},
"metadata": {
  "needs_background": "light"
}
]
},
{
  "cell_type": "code",
  "source": [
    "X_train = X_train.reshape(60000, 28, 28, 1).astype('float32')\n",
    "X_test = X_test.reshape(10000, 28, 28, 1).astype('float32')\n",
  ],
  "metadata": {
    "id": "CUFXG8X6Y52g"
  },
  "execution_count": 7,
```

```

"outputs": []
},
{
  "cell_type": "code",
  "source": [
    "number_of_classes = 10\n",
    "Y_train = np_utils.to_categorical(y_train, number_of_classes)\n",
    "Y_test = np_utils.to_categorical(y_test, number_of_classes)"
  ],
  "metadata": {
    "id": "MgjgSgRsY7Rg"
  },
  "execution_count": 8,
  "outputs": []
},
{
  "cell_type": "code",
  "source": [
    "Y_train[0]"
  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/"
    },
    "id": "dQj0k9g8Y-VJ",
    "outputId": "7c469531-9736-443c-ad69-42d1217e622e"
  },
  "execution_count": 9,
  "outputs": [
    {
      "output_type": "execute_result",
      "data": {
        "text/plain": [
          "array([0., 0., 0., 0., 0., 1., 0., 0., 0., 0.], dtype=float32)"
        ]
      },
      "metadata": {},
      "execution_count": 9
    }
  ]
},
{
  "cell_type": "code",
  "source": [
    "model = Sequential()\n",
    "model.add(Conv2D(64, (3, 3), input_shape=(28, 28, 1), activation=\"relu\"))\n",
    "model.add(Conv2D(32, (3, 3), activation=\"relu\"))\n",
    "model.add(Flatten())\n",
    "model.add(Dense(number_of_classes, activation=\"softmax\"))"
  ],
  "metadata": {
    "id": "z513cFg9ZBD4"
  },
  "execution_count": 10,
  "outputs": []
}

```

```

},
{
  "cell_type": "code",
  "source": [
    "model.compile(loss='categorical_crossentropy', optimizer='Adam', metrics=['accuracy'])"
  ],
  "metadata": {
    "id": "lpiZKaoXZFyy"
  },
  "execution_count": 11,
  "outputs": []
},
{
  "cell_type": "code",
  "source": [
    "model.fit(X_train, Y_train, batch_size=32, epochs=5, validation_data=(X_test, Y_test))"
  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/"
    },
    "id": "QxOJbyFXZHMz",
    "outputId": "776f2adb-37ff-44f9-acd7-0cc3e4c84ef6"
  },
  "execution_count": 12,
  "outputs": [
    {
      "output_type": "stream",
      "name": "stdout",
      "text": [
        "Epoch 1/5\n",
        "1875/1875 [=====] - 192s 102ms/step - loss: 0.2245 - accuracy: 0.9518\n",
        "- val_loss: 0.1058 - val_accuracy: 0.9701\n",
        "Epoch 2/5\n",
        "1875/1875 [=====] - 197s 105ms/step - loss: 0.0685 - accuracy: 0.9788\n",
        "- val_loss: 0.0962 - val_accuracy: 0.9752\n",
        "Epoch 3/5\n",
        "1875/1875 [=====] - 190s 101ms/step - loss: 0.0468 - accuracy: 0.9854\n",
        "- val_loss: 0.0900 - val_accuracy: 0.9749\n",
        "Epoch 4/5\n",
        "1875/1875 [=====] - 190s 102ms/step - loss: 0.0351 - accuracy: 0.9891\n",
        "- val_loss: 0.0993 - val_accuracy: 0.9748\n",
        "Epoch 5/5\n",
        "1875/1875 [=====] - 191s 102ms/step - loss: 0.0270 - accuracy: 0.9917\n",
        "- val_loss: 0.1005 - val_accuracy: 0.9764\n"
      ]
    },
    {
      "output_type": "execute_result",
      "data": {
        "text/plain": [
          "<keras.callbacks.History at 0x7fc493e218d0>"
        ]
      },
      "metadata": {}
    }
  ]
}

```



```

    "execution_count": 12
  }
]
},
{
  "cell_type": "code",
  "source": [
    "metrics = model.evaluate(X_test, Y_test, verbose=0)\n",
    "print(\"Metrics (Test Loss & Test Accuracy): \")\n",
    "print(metrics)"
  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/"
    },
    "id": "IvGyujOzc_7i",
    "outputId": "8612571b-5de6-4411-e575-2020e0629b9d"
  },
  "execution_count": 13,
  "outputs": [
    {
      "output_type": "stream",
      "name": "stdout",
      "text": [
        "Metrics (Test Loss & Test Accuracy): \n",
        "[0.10052110999822617, 0.9764000177383423]\n"
      ]
    }
  ]
},
{
  "cell_type": "code",
  "source": [
    "prediction = model.predict(X_test[:4])\n",
    "print(prediction)"
  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/"
    },
    "id": "G3aM15F9dIvE",
    "outputId": "188ee80e-2b40-42ff-ccd6-c013b338fa8e"
  },
  "execution_count": 14,
  "outputs": [
    {
      "output_type": "stream",
      "name": "stdout",
      "text": [
        "1/1 [=====] - 0s 92ms/step\n",
        "[[1.5678695e-09 1.6640128e-14 2.0494097e-12 1.5698962e-08 5.4015579e-15\n",
        " 3.6338055e-13 2.2240399e-20 1.0000000e+00 2.9577885e-08 1.9005494e-08]\n",
        "[5.8188578e-09 1.2512093e-10 9.9999821e-01 7.4831279e-09 1.0770124e-10\n",
        " 2.9252167e-18 1.6483800e-06 1.5410843e-14 1.2811967e-07 3.3103555e-12]\n",
        "[1.2689595e-09 9.9028254e-01 3.9091717e-08 1.3732340e-10 9.6216686e-03\n",

```

```

    " 2.9094124e-07 1.9340013e-10 4.5208512e-07 9.5003670e-05 2.4108826e-10]\n",
    " [1.0000000e+00 7.3556976e-16 3.5439882e-12 4.7910155e-14 3.2022885e-12]\n",
    " 1.5000925e-12 1.5939531e-11 4.1566353e-14 7.7353792e-12 1.2456662e-09]]\n"
  ]
}
],
},
{
  "cell_type": "code",
  "source": [
    "print(numpy.argmax(prediction, axis=1))\n",
    "print(Y_test[:4])"
  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/"
    },
    "id": "jHu3r3K5dM_V",
    "outputId": "b0992168-0e30-40d1-b64a-67977925f473"
  },
  "execution_count": 17,
  "outputs": [
    {
      "output_type": "stream",
      "name": "stdout",
      "text": [
        "[7 2 1 0]\n",
        "[[0. 0. 0. 0. 0. 0. 0. 1. 0. 0.]\n",
        "[0. 0. 1. 0. 0. 0. 0. 0. 0. 0.]\n",
        "[0. 1. 0. 0. 0. 0. 0. 0. 0. 0.]\n",
        "[1. 0. 0. 0. 0. 0. 0. 0. 0. 0.]\n"
      ]
    }
  ]
},
],
},
{
  "cell_type": "code",
  "source": [
    "model.save(\"model.h5\")"
  ],
  "metadata": {
    "id": "xcXLWZwbdYEA"
  },
  "execution_count": 18,
  "outputs": []
},
},
{
  "cell_type": "code",
  "source": [
    "model=load_model(\"model.h5\")"
  ],
  "metadata": {
    "id": "a9WaOY0HdZkN"
  },
  "execution_count": 19,

```

```

"outputs": []
},
{
"cell_type": "code",
"source": [
"from keras.datasets import mnist\n",
"from matplotlib import pyplot\n",
"(X_train,y_train),(X_test,y_test)=mnist.load_data()\n",
"print('X_train:'+str(X_train.shape))\n",
"print('y_train:'+str(y_train.shape))\n",
"print('X_test:'+str(X_test.shape))\n",
"print('y_test:'+str(y_test.shape))\n",
"from matplotlib import pyplot\n",
"for i in range(9):\n",
"    pyplot.subplot(330+1+i)\n",
"    pyplot.imshow(X_train[i],cmap=pyplot.get_cmap('gray'))\n",
"    pyplot.show()\n",
],
"metadata": {
"colab": {
"base_uri": "https://localhost:8080/",
"height": 968
},
"id": "Y3bfVqIVkmV-",
"outputId": "1e69d627-ce21-4dcc-b4ea-2c404d61a6dc"
},
"execution_count": 34,
"outputs": [
{
"output_type": "stream",
"name": "stdout",
"text": [
"X_train:(60000, 28, 28)\n",
"y_train:(60000,)\n",
"X_test:(10000, 28, 28)\n",
"y_test:(10000,)\n"
]
},
{
"output_type": "display_data",
"data": {
"text/plain": [
"<Figure size 432x288 with 1 Axes>"
]
},
"image/png": "iVBORw0KGgoAAAANSUhEUgAAAGEAAABiCAYAAABAKr0NAAAABHNCSVQICAgIfAhkiAAAAAlwSFlzAAALEgAACxIB0t1+/AAAADh0RVh0U29mdHdhcmUAAbWF0cGxwdGxpYiB2ZXJzaW9uMy4yLjIsIGh0dHA6Ly9tYXRwbG90bGliLm9yZy+WH4yJAAAPLklEQVR4nO2dS2wb13rHf2f4Eim+SZGWLVPv5Q6juOkdpAgLtDUCIIit8jioneVAgXuqkALdNGgXXSbdIGgQFcBetMUKNoGaIHeRYLgxkiTNkhsV4kdy4r1sCRLlChSssQ3ZzhDni4kTmRbtmWJlGiLP4DgcDjD+Wb+nHO+c85/ZoSUKjb7i7LfAbRpi9AStEVoAdoitABtEVqAtggtwK5EEEEK8KYQYF0JMCShEa1RQBw2x03aCEMlCTAC/BySAq8AvpJRjjQvvYLCbM+G3gSklp5bSUsgL8G/CzxoR1sLDuYt0jwPymzwng3KNWEElc9Ob5ipSy6/6ZuxFhWwghfgn8stnbeUq4s9XM3YiwAMQ2fe7ZmHcPUsOPgA+gfSY8jN3UCVeBo0KIfiGEHfhD4NeNCetgseMzQUppCCH+BPgMsAC/kLLebFhkB4gdp6g72li7OBqRur50/8x2i7kFaIvQArRFAhAlrQATW+stTJCCPN1//xarUatVkMIgaIoWy4npTRftVptx3E80yIIIBYLNhstgcOIMDhw4fp7+9HURSSVisWiwWPx4PVamV0dJTJyUl6enp4/vnn8Xg89PX10dHRYQo0NzfH7du3WV5eZnR0FE3TdhTnMytC/R9stVrp6OjYUoTe3l7OnTuH1WrF4XBgs9no7u7GbrdTrVZJJpMMDAxw8eJFuru7OX/+PH6/H13XqVarX

```

L58mS+//JLJyUkmJiYOlggOhwOLxWIWEXa7HY/Hg81mw+v1YrPZsNlsWCwWvF4v0WgUi8XywO/09vZy9Oh  
RLBYLVqsVIQQulwtFUTh27Bj5fJ7h4WH6+/sJBAIoikKlUiGfz1Mul1lZWSGdTpPJZA5WcSSEoLoZe5fLZQrh9  
/sZHBzE7XYzNDSEz+ejo6MDh8NBT08Pp0+fxmp9cFctFospjhACwzDI5XKqospr71Gf38/vb29nDlzBpvNhq7rl  
Mtl88BPT08zOTIjOp3GMIwd79NTI0L9H2+z2YjH43R1dZn/YI/HQzwep7Ozk1gshsfjwW6343A46Orqwuv1bnkm  
bEU2mzVfqqqSzWZJJpMIISiXy+i6zuLiVl8nmQySSaToVQqHYwzwW63093dTTAY5N133+X8+fPmgbZYLDgc  
DhRFuaeo2lzhPg4pJcVika+++oqqpSmKxSKqqmK327106RKGYZDNZtF13RQomUySSCQwDONgnQlOp5PDhw  
8zNDRER0cHHR0d2/6NWq1mppQAiqKgKOTNJSklhmGQsqWYn5+nUqncc2B1XSeTyZhFUqVSYW1tjUKhsOt  
9e2pEqFarZLNZFEUh8tRLBZRFGXbIlQqFVKpFJqmmQc4HA4TiUSQUiKtVikUCoyNjXH58mUzDa0jpaRSqV  
Cr1TAMglqtRqVSaci+PTUi1Go1yuUyDocDVVXRNA2n07nt9Q3DIJPJUCwWKZVK6LqO1WolFAqZImiaRjKZ  
ZHZ2tnk7sgWPFUEI8Sv94G0lPK3NuYFgX8H+oBZ4OdSyrXmhYn5zysUCoyOjuJwOlhGo8RiMXRdJ5fLYbPZ  
GB4eJhAImOtpmkY+n2dpaYlPPvmEdDqNqqrouk53dzexWAYv10tPTw9ra2uUSqVm7saWbOdM+CfgH4B/3jTvP  
eCSIPL9Db/Re8BfND68n5BSooqqlWqVkJZER0uk0AwMDnDhxgkKhWnzcHG63m0gkco8IpVKJpaUlxsfH+fjjj5  
menkbTNLM4ikajxONx3njjDTRNa0gZ/6Q8VgQp5VdCiL77Zv8M+J2N6Y+A/6bJItSp1WpkMhmsViuKoiClpFwu  
s7S0hMfjIZFI0NnZic/no7Ozk2KxyNzcHAsLCxQKBTRNQ9d1s3jLZDLy7XZ+/PFHDMOgWCzuxW7cw07rhKi  
UMrkxvQREGxTPY6lWq8zMzDA3N8etW7fo7Ow0D57f7ycWi7G8vMzp06c5fvw4i4uLp755yQSCdbW1qhUKm  
Z2VCgUKJVKpNNpJicnkVK2bHH0SKSU8IHDls2wwOi6bvbfVCoVs1K1Wq0UCgUKhcI9mUv9oG9OTwEzAzI  
MA1VVGxniE7HT8YSUEKibYOM9/bAFpZQfSClf2mpsdbeYhkG5XEBTNLMNNoKoq5XLZzPejkQivvvoqZ8+ex  
e12b9mRt9/sVIRfA+9uTL8L/Fdjwnky6qlLPZ+vN7jqFa+U0mzcRSIR7Ha7OTbQSmwnRf1X1ivhsBAiAfw18D7ws  
RDij1l3lf28mUFuF1VVGGRkZMTOIYDCIxWihHo+j6zpHjx4FIJVKkc/n9znan9hOdvSLh3z1uw2OZddomsbY2Bg  
Oh4Pjx49z/PhxotEoR48epVKpEiVUFWVQqHwdInwNFEvnnRdZ2Zmhm+//Zbh4WHi8TgOh4NTp04RCoxw+/0  
kk0mz/igWiywtLe2qE243PFMiwHrmZBgGV69eZXp6mjffjJNz587R2dnJW2+9haqqjI+Pk0qlSKfTLC4uMjc3Rya  
T2ZeGGjyDIgBmAy6bzbK8vMzc3Bwej4fOzk7cbjddXV3mkGa9C3xiYgKn00mhUDAbc7sZI3gSnkkRYL0hVi6X  
GRkZ4cMPPyQWi/HOO+8QjUYZHh4G1lPcSqXC9PQ0DoeDVCrF999/z8rKCsVikXK5vCexPrMiVktVqtUqmU  
yGmZkZAHK5HD6fD7fbbZ4BiqKgqixWAYr1crMzIzZwVdvwDXbr/vMilBnbW2NGzdusLCwgKZpRCIRXnnlF  
QYGBswOvEgkwsWLF8lkMvh8PhYWFrh27Rrj4+NUKpWm9yc98yKUSiVKpRKrq6uoqorf7ycQCOByubDb7U  
QiEdxuN8PDwxQKBVZXV/H7/eYIW/03mnk2PPMi1KkP6miaxjffEMikaC/v59jx47R1dXFqVOnsNlsDAwMEA  
wGMQyDUCjE1NQUX3/9NbquNy22AyXCysoKiqKwtraGw+FgcHCQkydP8txzzzE4OEggEODkyZPUajVCoRAn  
T57k0qVLXLlypS1CI6nVauie6jpSS1dVVEokEkUiEarUK/OTcc7vdhMNHqQEgUAAq9VKsVg0l2skB04EWB/0r  
1Qq3Llzh8XFRex2O+VymVqtZtPlurq6CAQCJBIJTpW4wflYMiNTU00ZbzgwlTNwYqiYLPZTD+SxWlXrY+bqa  
eve9HjemBEsNlsRCIRXC4Xg4ODRKNRAoEakUiEvr4+fD7fPSaxbDZLJpPhzp07TExMkM1md2z4fRzPvAj1Mt  
5ut+P1evF4PPT29hKLxTh06BBHjhwhFApht9vNdaSUAjPgsVgkn8+b/UrNSlO3M54QY91pEQUk8IGU8u/3w/byJ  
LjdbpxOJ5FIxDQJDw8P4/P5iMfjBINBXC4XHo8Hp9NpGobrf3yoqkoulzPriv1uJxjAn0spvxNCeIARicRvgD9ij20  
vT4LT6SQYDDI4OMiFCxfo6uripZdewu/34/V6H+rcq49D11vKqqruf7fHqsiuTGdF0L8yPrNRfbN9nI/9crWZrMR  
DodxuVwMDAZQ09NDPB7nxIkTeDwe8+DfbxDWdd084PPz8+TzeW7dusWdO3e4efNm08cZnqhO2PAfnQEus4  
+2l/up2+Pdbjcvv/wy3d3dnDt3zrzMKRKJoCjKPREWbEZVVRyWFrh79y6ffvops7Ozj12NMT09bfa0NjX+7S4ohH  
AD/wH8mZQyt3lHHmV7aYblpZ4+Wq1WU4BYLIbP52NgYIBoNMqhQ4fw+/1mH9HmeOuG4FKpRlFYJJPJM  
DU1xerqKvPz8ywtLZnXHewF2xJBCGFjXYB/kVL+58bslBCiW0qZfJTtpdF3ealf0uRwOMzOuKGhId5++21CoR  
C9vb14PB5cLhdOp/OBXL9Wq5FKpchkMty4cYPvvvuOdDrN9evXKZVK5HI5NE1rWjq6FdvJjgTwj8CPUsq/2/R  
V3fbyPk22vWy+NslqteL1enE6nYRCiaLRKEeOHGFwcND87HK5zHXr4871ytYwDFZXV1lZWwFhYYHbt2+T  
TqeZnp6mXC43vRLecv8et1EhxGvA/wA3gPp431+yXi98DMTZsL1IKVcf81tPvIf1YchQKMSFCxcIh8McOnQIr9  
dLIBAgFArh8/no6+vD4XDgdDrvqXjz+TzpdJq1tTWuX7/O6uoq4+PjpNNpUqkUqVSKcrnM2tpaU/qF7mPLG4xsJ  
zv6X+Bhbfem214sFgt2u51AIMDZs2eJx+PEYjECgQA+n49gMPjI9VVVZWVlhWQyyZurV0gmK9y8edN0V+yX  
w2IzLdViVhQFv99PR0cHsViMaDSKx+MhHA4TDod54YUXCAAd+P1+nE7nlrl+3ZG3sLBAOp1mdnaWkZER7t  
69y9jYGNlslwuZ15t0wq0lAhWq5VIJILf7+fl11/n7NmzZmXb0dFBOBzGZrMBbNmxttl3NDk5ybVr1xgdHeWzz  
z6jXC7vSet3J7SUCBaLBb/fb6aY3d3deL1e3G43drvdzPPRxtO6cat+UHVdJ5VKUSgU+OGHH5iYmGBhYQFVvc  
3rzVpNAGgxEWw2G8eOHWNolGXX3yRM2fOmF3O9Y64+kUi+Xye2dlZpqamzIObz+f54osvSCQS5HI500O0F  
10Pu6GIrADMS1RzuRwrKysPFDvVapXl5WXy+Tzz8/PMz8/fl0IkTCdFc1u6TaKlroHXr1OcLlc+P1+PB7Plstpm  
ka1WjUNWvV9MAyDu3fvmt+34L9/ZynqXmIYBouLi/sdxp7TvvNXC9AWoQVoi9ACtEVVoAdoitAB7nR2tAMW  
N96eNMLuPu3ermXvaTgAQQvxfM65pbjbNjLtdHLUAbrFagP0Q4YN92GYjaFrce14ntHmQdnHUAuyZCE/L0w  
mFEDEhxBdCiDEhxEOhxJ9uzA8KIX4jhJjceA887re2zeY7nzfrxfozd24DA4AduA4M78W2dxBrN/DixrSH9acqDg  
N/C7y3Mf894G8atc29OhOemqcTSimTUsvNqbwGbv7Ucbi30E/EGjtrlXImzldMIje7TtHbNX3tt2xfwQ7vfebv5O  
rpdJDUsr90qEbT2dsFV4lPd24/tH3nLuSdkeZ6apxNuW3sLjfbe7mHW8RbrmcZt4K/2Owt6RJyvsV7U/ABc23i9B  
YSAS8Ak8DkQbNQ22y3mFqBdMbcAbRFagLYILUBbhBagLUIL0BahBWIL0AK0RWgB/h/Sh2Z31SuXDQAA  
AABJRU5Erkkgg==\n"

},

```
"metadata": {
  "needs_background": "light"
},
{
  "output_type": "display_data",
  "data": {
    "text/plain": [
      "<Figure size 432x288 with 1 Axes>"
    ],
    "image/png": "iVBORw0KGgoAAAANSUhEUgAAAGEAAABiCAYAAABAKr0NAAAABHNCSVQICA
gIfAhkiAAAAAlwSFlzAAALEgAACxIB0t1+/AAAADh0RVh0U29mdHdhcmUAAbWF0cGxvdGxpYiB2ZXJzaW9u
uMy4yLjIsIGh0dHA6Ly9tYXRwbG90bGliLm9yZy+WH4yJAAAPcklEQVR4nO2dW2wbV3rHf4fDu0iKiWRoq6
ULUWy41huHDT2nWSdoMDCCLB9SBZdIEULFNiXFGiBPjRoH/q67UOBvgblomlQpC3SIs1DnGLrNPBFdrB1n
FRWVrUkS5ZlineJ4k28DE8fJE7la2SRlCmbf4Dg8HDI883855zvemaEIJWnix0T1qAFlokNAVajDQBWiQ0AVok
NAFaJDQBaiJBCPFjIcT/CiHmhBDv1UuoZw1it36CEEIBbgG/AwSAXwM/k1J+Xz/xng3UMhJOAHNSyttSylwT
8BP6iPWswV9Db/tBZa3fQ4AJx/1AyHEs+6ex6WUXfc21kLCjiCE+Dnw80b3s09w50GNtZAQBPq3fe7barsLUsr3
gfehNRlehlp0wq+BESGEXwhhBH4P+Kw+Yj1b2PVikFKWhRB/DPwHoAC/IFJO102yZwi7NIF31VlrOroupTx+b
2PLY24CtEhoAjTcRG1GKIqCoigYDAZMJhOKomAymQAoFAqoqkqhUKBYLfkpVFBVtaHyPHMk6HQ6urq6c
DgcHDhwgMOHD9PV1cWhQ4cAmJ6eJh6PMz09zezsLOl0mlgsRqVsaZhMzyQJNpuNjo4OBgcHOXz4ML29vZ
w6dQoAo9FIKBRifX2dRCJBpVIhHo83VKZnhgSDwYDT6cRut3Pu3DmOHDmCz+ejv78fm82GwWAAYGRkhJ
6eHjo7Ozl+/DhXr17l448/buiU9MyQoNfrcblcdHZ28uqrr/L6669jMpk0XVDFwMAAAH6/n2KxiKqqfPLJJ2xsBD
Otob9c5PAZDLR1taGy+Xi1KIT9PT04PP5MBgMKIoCgJRSu9K3z/1GoxGbZybb7Uav15PJZFBVte764aknoa2tjY
GBAfx+P++88w6Dg4N0dXVhtVqBTQIqlYpmCZXLZaSUmM1mLBYLTqcTv99PLBZjaWmJfD6PIJJ6OrlPHQIC
CIQQGAwG9Ho9nZ2d+P1+hoaGcLlcOBwOjEbjXftXKhXNJE0mk5RKJXw+n0bC6OgoTqeTUqlEOp1mdXWVf
D5fP5mfrCF0WhEURS6u7vp6OjgpZde4u2338blcjE8PlzVakWv1yOE0H6TyWQIBoOsrq5y6dIlIpElb775Jq+99hq
ZTIZ4PM7Kyqgff/45oVCly5cvMz8/vxvxHhi2eKpGgk6nw2w2YzQa6ejowOv14vP5GBwcxOFwYLVaNSToO6o6o
Vgsaic8nU5TLpexWq34/X4sFgs+n49yuYzZbK6r3E8VCVarlTfeeIOBgQHGX8fx+/10dXXR3d2tjZAHwWw24/P5
MJIM2O12jEYjyWSS2dlZnE4nXq8Xg8GAX+OhVCphsVjqKvdTRYLJZGjsblznn3+eiYkInnvuufv2kVLeNRXBp
vna3t6OqqaGCOBzRKNRgHweDwoioLdbqe9vf0unVIP/CAJQohfAm8CUSnl81ttLuCfGsfGefiplHK1rpI9BoxGI
w6HA4/Hw+DgIMPDwzgcjrtOdqlUIpFIUCgUiMfjZDIZ+vv78fv9mmLOZDIkEgmioSiz7NsbGwwNjbGyMjIfcT
VEzuJov498ON72t4DLkgpR4ALW5+fGEwmE16v1/7+fg4ePMjo6Chut/uufYrFIqFQiPn5ea5cucL58+eZmZnR9EE
2m2V9fZ1oNEowGGRqaorJyUnm5+epVCqa1dUIMn5wJEgpLwohhu5p/gnwo63tD4GvgD+vo1w7QjUK6vF4mJi
YwOfz4XK5MBgM6HSb11ehUCCbzZJIJjiamiKZTBKJREin00QiEebm5sjn8ywwLxOLxTSILKUkn8+TSqVQVR
VFUXA6nRSLRdrb27Hb7RSLRQqFQs3HsVud4JFSrmxthwFPzZLsAtUp6OjRo7z77rt4PB46OzuxWCzaFbu6usqt
W7dYWFjggw8+YGVlhb6+Pjo6Orh+/TrRaJRIJMKVK1dIp9OEw2FyuRw6nQ4hBOPj46iqitVqZXR0FI/Hw+joK
MvLy8TjccLhcM3HUbNillKR9n/jSh50el06HQ6LRxRtYDcbjdGo1HzgiuVCrlcjKQiQTweJxaLEY/HsdlKlIqKdh
oNEo4HCaTyZDNZimXy1pfxWIRKaVm/pZKJZxOJ263m1wuhxCiZu95tyREhBA9UsoVIUQPEH3YjvUueRFC4
HQ6sVqtHD16lJdffhm/34/T6cRkMmlJmWw2S6FQYQZmhzqXrxIKhVhdXSWXy7GwsEawGNSms0KhWnraGu
Vy+aHR0qoXbrVamZiYwGw2c/HiRRYXF58YCYZ8BfWd8Yuv932uS4jEghMBisWCz2eju7mZoaAiv14vRaESn01
EqLTRLp6oLQqEQ0WiUQqFAuVwmnU7vqm+dTqeFqYGBnA6nXVR1DsXUT9mUw13CiECwF+xeFL/RQjxR2
xWlf20Zkl2gGoa8tixY5o/8MILL9DW1gbA2toaX331FYFAgFgsRjKZJlMsrS0RCaToVQq1SyDEAKbzaaNxnpGJ
9bRzx7y1Rt1kWCHEEKg0+kwmUwcOnSIM2f04Pf7GRsb0+z8dDrN119/zdTUFIFAgEgkouWSS6XSXXN9LXK
Yzeb7AoG1YN94zIqi0N7eroURent7telgXWV7777jnA4zNzcHKFQiFQqRaFQ0KaoRuQB6oV9Q4LRaMTr9dLV
1cXlyAiHDx/WfFAIMBH31EMBjk5s2bJJPB8b8m3XN9r4hwWAwaFHR9vZ2DAYDxWKRfD7P+Vq6ZoJub
GzUPR9c9ZQbReK+IaGjo4Nz585x8OBbBgHgU1HLBAIMDMzw8zMDJFIpC4e7HbcG65oRoii6UkQQqAoCm
azWRsJVatKY2ODVCpFKpUik8nUNdv1KFQdwXqh6UlwOp309/czMjLC0NAQvb29WK1WpJTEYjGmpqZYWF
ioi/n5IFR1S/WlqiqJRIKlpSXW1tbq0kfTk2C1WvH5fPT09OByuXA6nVpyJp1Oa4G3RtYFbVfyUkqy2Sxra2ta0r9
WND0JOp0ORVHQ6/UoinKXyRmJRLh16xaRSKRu16EalxocHKSnp4exsTH0ej2IUoLYLEY6neb69et8++233L59+
9kgYXvIRJWEQqHAXsYGGUCAqakpstls3UioEj4+Ps7Jkyc5cuQier2eQqFAIBAgGo0yOTnJpUuXtOBerWh6Eraja
pVsT8xvbGxQLBbr8t9VM9hutzm8PMYBAwdwu90Ui0UymQyBQICVIRVSqRTFYrEuHjjsMxKqUFWVcrmsW
UelUqkma0UIgV6vx263c/r0aYaGhjh79iwnTpxAVVWNGLsXL3Lnzh2WlpYoFAp18xv2HQLSSgqFAv18Xgtb75aA
qr6pljs6nU56enro7e2lvb1dK30MhULaVJRIJOqmkKvYdySoqsri4iJLS0sEg8GaTobD4cDtduP1ejlx4gTd3d2cOXO
Gnp4e1tfXuXHjBjdu3ODTTz8lIUqxsrLCxsYG2Wy2jke0D0momoi1XJFVr7da5uj1ejl06BDd3d0MDw/jdruZnp5m
ZWWF2dlZr1271IBHcCf5hH7gH9jMI0vgfSn13+1l2cv2UIGiKPT29mIwGJienn7sEIKiKlyMjODxeBgfh2diYgKXy
```

8Xo6CgGg4FwOMzS0hJffvk1165dY3l5uWGOYBU7GQl14M+k1N8I1ezAdSHEr4A/ZLPs5Rdbt9l5jwZUXGw/ydU  
QhtfrxeFw4HK5HpsEvV6v5SFOnz7N2bNnMRqNWK1W8vk8V69eJRgMcunSJb744ot6H86DZfqhHbaqKla2ttNC  
iN+weXORPS97qU491WT+wMAAx48fj51OE41GtcRNpVKhra1NS4N2dnZiMBhoa2vDbDZz7Ngx+vr68Hq9lMt  
lrRo7nU4zOztLIBBgDXXvatkeSyds1R8dA75mj8petsdtqrBYLJhMJo4ePcpbb71FMBhkenLyrmqJ6kkeGhrirRdfxO  
Fw0NfXh9Vqxe12Y7PZyOVyZLNZUqkUi4uLJBIJLl++zPLYMoFAoBGH80DsmAQhhA34V+BPpZTr26eBR5W  
9NKLkpZrqtNvt9PX1oSgK0WiUbDarrabp6+vD4/HQ19dHT08PbW1tuN1uTCYTer0eVVXJ5Xlkk0ni8Tjz8/Pa9tra  
Wt1D4o/CjkgQQhjYJOAfpZT/ttW8o7KXRtZlpagoh4aG8Hg85HI5Tp8+rSV5VFWlu7sbl8uF0WjEYrFouWYpJeF  
wmFQqRTAYZHFxkcXFRc6fP6+FxIvFYsOV8XbsxDoSwAfAb6SUf7vtqz0pe6mGKKpesqqqWnWcxWLBYPFgt  
9uxWCyaF62qKm63m/b2du0/qv9TLpdJpVJa5V04HCYUCrG8vLzrUphasZOR8NvA7wNTQohvt9r+gj0qe8lkMiw  
sLKAoCnfu3EEIQWdnJzabTdunWrauqio2mw0ppbYqs1wua3Vlc3NzJJNJLly4wMzMDLlcjkwmw/r6+p4lhB6EnV  
hHl4GH2YENL3spFAraXB2Px3E4HNjt9vtI2L4AZLsSr94ilZ1Os7CwQDgcZnJykm+++abRou8YTe8xl0oLX5z4c  
IFbt68qS0E7+3tpb+//z5fQUpJMBgkGo0Si8W4ffs2a2trfP/996ytrRGJRJ7Q0TwY+4KEUqlEPp/ns88+o62tjVdeeY  
WDBw9y8uRJ+vr67vuNIJLFxUVu3LjBrVu3uHLlCuvr61ohQLOVvjQ9CVVUKhVtVX0gEEBKiv6vp1wua4oa/n  
9d8vT0NHnzcwQCAVKpFPI8vuaQd6Owr5bQV921dY3Go333RahikKhoHnQ1au/0bfM2QH2/xLa6lWcy+WesC  
T1RevOX02AFglNgBYJTYAWCU2AFglNgBYJTYAWCU2AvfYT4kB2632/oZPa5R58UOOeeswAQoj/fpDX2Ox  
opNyt6agJ0CKhCfAkSHj/CfRZDzRM7j3XCS3cj9Z01ATYmXl2y9MJhRD9Qoj/EkJ8L4SYFkl8yVa7SwjxKyHE  
7NZ7R906vXd1YiNebD5zZx4YBozAd8Chveh7F7L2AL+1tW1n86mKh4C/Ad7ban8P+Ot69blXl2HfPJ1QSRkipfx  
mazsNbK+9/XBrtw+B361Xn3tFwoOeTti7R33vGntVe9tSzA/BvbW327+Tm3NS3czKvSJhR08nbBY8qvZ26/tH3n  
LucbFXJOybpXPUoPYW6l17u4dWxzk2LY154C+ftBX0CDnPsDnV/A/w7dbrHOBm80a8s8B/Aq569dnymJsALcX  
cBGiR0ARokdAEaJHQBGiR0ARokdAEaJHQBGiR0AT4PwxKUaf3Wq3AAAAAEIFTkSuQmCC\n"

},

"metadata": {  
"needs\_background": "light"

}

},

{

"output\_type": "display\_data",

"data": {

"text/plain": [

"<Figure size 432x288 with 1 Axes>"

],

"image/png": "iVBORw0KGgoAAAANSUhEUgAAAGEAAABiCAYAAABAKr0NAAAABHNCSVQICA  
gIfAhkiAAAAAlwSFlzAAALEgAACxIB0t1+/AAAADh0RVh0U29mdHdhcmUAAbWF0cGxvdGxpYiB2ZXJzaW9u  
uMy4yLjIsIGh0dHA6Ly9tYXRwbG90bGliLm9yZy+WH4yJAAAK4klEQVR4nO2dy28b1xWHvzMPvoakKJKSQ  
0uin4IQI3HkwnCbtIsCRYMgmXRZFA6CIosCWaQFWqAbo11023bRP8BAG2ZRtCjQAs2ucYMCTjdGXMd9OE  
Ydu4ZtSTYliu+X+LpdSjZKjnzT4pAcR/MBaw4vObyH/M2999xzD2dEKYXHeNHGbYCHJ4Ir8ERwAZ4ILsAT  
wQV4IriAgUQQkVdE5D8icl1Ezjhl1F5DdjtPEBEduAZ8E1gCPgbeUEp96px5e4NBWsIp4LpS6r9KqSbwO+A1Z8  
zaWxgDHDsD3Nn2fAn48qMOEJG9Pj3PKqWmHiwcRIS+EJG3gbeHXc9Tqw2dCgcRYRmY2/Z8dqvSppRSZ4Gz  
4LWEhzHlmpAXmC8ih0TEB5wG3nfGrL3FrluCUqotlt8H/gzowLtKqSuOWbaH2LWLuqvKvO7o70qpkw8WejN  
mF+CJ4AI8EVyAJ4ILGPpk7YuAiCAiaJqGiNDpdOh2u459vifCY4hElkxPT5NIJHjppZcIBoOcP3+ea9euUavVqFa  
rA9fhifAYLMTidnaWw4cP8+abbzI5OumhUGBtbQ3giyeCpmlEo1F8Ph+GYaDrOtVqlXw+z7hSc/x+P/F4nEgkQq  
VSAaDVaiEijtXhKhEMw2BmZoZYLEYwGCQQCLC0tESpVKLdbo/FJsuymJubI5FlkM1myefzjzp923GVCJqmE  
Q6HiUajRCIRQqEQhULB0bNuNzb1TgjDMNA05x1KV4lgmibpdJp0Ok08HicajaKU4uLFi7RarZHbIyKEQiGSyS  
SJRIJkMglAIBBwtB5XidBrCf4nFgsRjQaJRGmJqUI9Fxs0zQJh8OEQiemw7Bd006n49g45SoR/H4/x44dY3FxxX  
K57Hjf+yT0uqB0Os2LL76IruvcvXuXfD7PysoKmUyGZrPpSF2umjHrus4zzzzDwYMHmZiYGKstpmkSDAZJJp  
McPnyY/fv302g0yOfzFItFyuUyGxsbjtT1WBFE5F0RWRWRf28ri4vIORH5bOtx0gljet3OOAdi2OwWfXyWePnl  
zl+/DiGYdDpdCiXyxQKBcdagF1fh+/5NfDKA2VngA+VUvPAh1vPnTFoKzQwTjRN4/jx47z++uucPHkSwzBot9s  
UCgVyudzoRVBKnQdyDxs/Bry3tf8e8K1BjNB1HcuYCIvCBAlBfD4fuq4P8pEDYxiG7Zb24kU9ERqNhrN17fK4  
fUqpulv794B9gxxgRCARipVLMzs7arqn7x/klwfGNE0CgYBtr6PR4Pr161y7do1SqeRoXQN7R0op9ahly35SXnR  
dJxwOE4IE7JDFuLokTdPQdR3DMPD7/ei6jojQ7XZpNBpUq1XHZ++7FSEjliml1F0RSQGrD3tjPykvkUiEZ599ln  
Q6TSwWwzTNsXRHmqYRCoiUBoPE43GSySThcBgRod1uUyqVxjYw78T7wFtb+28BfxrECNM0SSQSxONx/H  
6/HRpQSo00cCci+P1+W4hQKITP50MpRbfbZWNjglar5ehaAvTREkTkt8DXgaSILAE/BX4G/F5EvstmVtm3BzH  
C5/MRj8eJx+OYpglAuVwmk8lQKpUc/9IPIxAIcOrUKQ4cOMDCwgKWZdHpdMjlcuTzeer1OhsbG3Q6HUfrfawI  
Sqk3HvLSN5wywjRNYrEYExMTmKaJUopqter6+jqVSmVkrSEQCLC4uMhzzz3HkSNHsCyLcrlMsVikWCzSaD  
TG0xLGRa1WY319nXK57Lgluq6jaRqWZRGNRu8L0i0sLJBOP4IElGdK83muXLnCjRs3KJfLJvNvSGCUop8Ps

+tW7fIZrOOof2nTNDfNk9nZWY4ePUoqleLUqVPE43FeeOFEeomE7ZqurKxw7tw5lpeXyWaz1Ot1R20Bl4rQL4Z  
hYBibX6G3GB8IBNB13d56r/UmhIZh2G7wzMyMHTYPh8MEg0FM07zPRW42mxQKBYrF4tAWllwrgt/vx7IsAo  
HAQ+cMkUiEqakpWwCfz8eRI0eYmJiww889vz8ajbK4uEg0GkXTNHvTdZ1Go0Eul7Nnxu122w5ll8tlu0U67Zr2c  
IUID7qiPVext8IWiuQ+t6gjlKxOTtoiWGb4eWZmhsnJSaLRKJZl2T9mLBbj6NGj9kIRYLucSil70G2323S7Xdumdr  
tNpVKhVqsNzUtzhQjdbpdWq0Wr1aLT6SAinDhxng8Ti6XY2lpaUe3cGpqin379tmzWk3T7F1373m9XqdYLNltd  
rly5QqdTsf2urLZLJlMhlqtxurqKpOTk7zzztMTExgGAZKKWq1GmtraxQKhS9+d9TpdOzVKhFhdnaW6elpO9tip  
7MwmUySSqXs7qj3OUop258vFot2t9LzcG7fvk02m2V5eZmbN2/SaDQolUqkUilOnz5tJ3cppWi1WkNfYHKFCLl  
cjo8++ojp6WIEhLm5OTui2mw2qdVqOx7X7Xap1+vU63VWV1dpNBpUKhWazSb5fJ5SqUS9XqdSqbCxcH6+jo  
bGxt2xkShUKBUKhEMBPmfn2d2dpZEIkEwGLTXD+r1+tDnKa4QYXV1lQ8++IBoNEqn0+HgwYOk02lSqdQjj+  
tlYqytrfHJJ59QLpdZWVmhUqlw584d7t7dDPRu/xF7+9sfw+Ewzz//PHNzc0xNTREKheWVtFqttjdEgM2zutlssry8b  
J+F9+7d6+vYQqHArVu3qNVqZLPZJ452mqZph018Ph/w/7BJSVjcOyIA1Ot1Lly4YGff9RtJ7QmolLLHhCcZRC3  
LYn5+3u4GIVLcuXOHY5cvc/PmTcdjRQ/iKhGUUkOZkT6Onkvs8/nsCG6tViOXy40kduUqEdxCt9tlaWmJS5cucf  
v27aG3BFelvLiJarXK6urqSFpCPykvcyLyVxH5VESuiMgPtsqHkvayF+mnJbSBHymIjgFfAb4nlscYYtrLXqOfIJe7  
SqlLW/tl4CqbFxdxNO3FLfRm373YldPJvzvXRGOCiBwETgAXcDjtxU2liP03qV7UdZj07R2JSBj4A/BDpVRpe3j5  
UWkvT+tVXnprEMMWAPpsCSJisinAb5RSf9wqzmylu/CotBel1Fml1MmdLifgVnre0Khyn/rxjgT4FXBVKfXLbS  
85mvbiFnoCaJpmz9yHTT/d0VeB7wD/EpHLW2U/xuG0FzchliQSCQ4dOmSHwodJPYkvfwMe1i4dS3txG5Zl3ZeB  
N0y8GfMDbF8gGhWeCA9hlEJ4ATyg3W6Ty+WwLGoGRWPwmsJQKVS4erVq1y9epVqtTryRGSvJYC9Jh0M  
BllaWsLn85HJZMJclerYow8S7Bh6bWeGxWay/38/+fsJhUKUSiUqlQqlUolMJuNUztGO18DzRBgt3oUI3Yonggv  
wRHABngguwBPBBYx6npAFqluPTxtJBrf7wE6FI3VRAUTk4tO0wNNjmHZ73ZEL8ERwAeMQ4ewY6nSCodk9  
8jHB4/N43ZELGJkIT8vdCceSe9tbwBjmxuY9d24AhwEf8A/g2Cjq3oWtKeBLW/sRnu+qeAz4BXBmq/wM8HOn  
6hxVS3hq7k44jtzbuYmw090JZ0ZU964ZVe6tNzA/hAdzb7e/pjb7JMfcylGJ0NfdCd3CILm3u2FUIjw1dyccS+7tCL  
2OV9n0NG4APxm3F/QIO7/GZlzfT+Dy1vYqkGDzH0mfAX8B4k7V6c2YXYA3MLsATwQX4IngAjwRXIAnngv  
wRHABngguwBPBBfwP4+2+QZlet8AAAAASUVORK5CYII=\n"

```
  },
  "metadata": {
    "needs_background": "light"
  },
},
{
  "output_type": "display_data",
  "data": {
    "text/plain": [
      "<Figure size 432x288 with 1 Axes>"
    ],
    "image/png": "iVBORw0KGgoAAAANSUhEUgAAAGEAAABiCAYAAABAKr0NAAAABHNCSVQICA  
gIfAhkiAAAAAlwSFlzAAALEgAACxIB0t1+/AAAADh0RVh0U29mdHdhcmUAAbWF0cGxvdGxpYiB2ZXJzaW9u  
uMy4yLjIsIGh0dHA6Ly9tYXRwbG90bGliLm9yZy+WH4yJAAAKjklEQVR4nO2dy28xx3HP7+IKL5EkTIpSzQl  
W7Wt6GUEqVPURqogDeIGQdDABYIEzaHIoUAQoAVaolca7aHXtof+AQEaNIcBYE2aYEcitqoYTiHxnaj2pAl  
Vw/Tkhi9SYovUXxNdyK3kiLbisTHStoPQHA5u8v5Yb+Ymd/M/GZHIFKY1Bet3gaYmCIYAlMEA2CKYABME  
QyAKYIB2JMIivKKiNwXkXERuVQpow4bstt+gohYgP8C3wJmgJvAW0qpe5Uz73Cw15LwdWBcKTWplMoCfw  
AuVsasw0XDHu4NAtMbfs8A5x53g4gc9u75klKqdWviXkTYESLyDvBOTfPZJzzcLnEvIoSBzg2/O0ppm1BKvQe8  
B2ZJeBR7aRNUAt0i8hURaQS+C/ytMmYdLnZdEpRSeRH5lfb3wAK8r5Qarphlh4hdu6i7ysysjm4rpb62NdHsMRs  
AUwQDYIpgAEwRDEDVO2v7DU3T9G8R2XSuUCiglKLSzowpwwgbsdjsDawP4fD56eno4ceIEIoKIsLi4yNWrV1  
lYWGBpaYlklMlxfE0RNTdY2EhfXx+nTp3iwoULPPfcc7oI4+PjzM3NYbVaSafTpgiVxuFw0Nrait/vp6+vJ9OnT+  
P3+wFQSm2qlszqqEp4PB7Onj1LR0cHL730Ek899RQ2m01/2MVisSoPv4zpHQEWiwWXY4XL5cJut2O322loaKja  
Q9+KWRIAq9VKS0sLR44cweFw0NDQ8AXPqJocahFEBIvFgs1mo6mpCafTqQtQrn4KhQLZbJZkMkkul9Pd1Ep  
yqEXw+Xy0tbUxMDDA888/T1tbGy0tLQAKegmSyST37t3jypUrLCwscPv2bVZWVkilUhW141CL4HK5aG9vJxg  
M0t3djd/vx+10ApDJZIJh44yNjfhxxx8Tj8eJx+PkcjlyVxF7XiiCCLyPvBtYEEpdaaUdgT4I9AFhIA3IVLRilpWJU  
QEr9eL0+nkmWeeYXBwkOPHj9Pc3IzVakVEKBaLTE1NMTIywv3794nFYqTTabLZrO4pVZKdeEe/A17ZknYJu  
KqU6gauln7vCzRNo7W1la6uLs6fP8/rr7/OCy+8gNfrxW63o2kaSikmJye5fv06d+/eJRKJEI/HyWaz5PP52ouglLoO  
RLYkXwQ+KB1/AHynolZVEU3TaGlpiRgM4vP5cDqdmx5+MpkkGo0yPz9POBwmEolQKBSqatNu24Q2pdRs6X  
gOaKuQPvXHYrHQ09PDs88+S09PDy0tLWiahqZpZLNZZmZmWF5e5rPPPuOTTz4hn88bVgQdpZR63LSlkUJe  
RISGhgY8Hg9Hjx7F7XZjsVh0lzSXyxGLxVhcXNTbgVqWwXhmRSSglJoVkJQCw8KgJLRLyomkaTqcTr9fLmT  
NnGBwcpKmpCYB8Pk8mkyESiXDjxglGR0eZnJysnW27vO9vwNul47eBv1bGnOphsViw2+04nU78fj/Hjh2jubkZ  
QO+QpdNpwuEwoVCIIZWVmtm2ExflMvBNwC8iM8AvGF8CfxKR77MeVfZmNY3cC42NjfqDv3DhAsFgkFOn
```

Tm26ZmVlhaGhIWZnZxkZGWFYsJYIiil3nrEqZcqbEtVsFqtNDc309HRwcvv8zJkyfp7OzcdE0ikWB4eJjp6Wkm  
JiaYmZmpqY0HvsfscDhob28nEAjg8/nwer1YrVYAkssk8Xic6elp7t+/z+zsbM0a440ceBG8Xi+9vb16CQgEAlgsFg  
Ci0SgTExPcuXOH69evs7i4SCKRqLmNB1YEu92OzWbD7/ft2dlJe3u73ilbW1ujUCiwsLDagwcPCIfdJJNJmPk  
MxWKx5rYeSBFEhI6ODjo7Ozl37hxvvPEGHo8Hj8dDsVhkbm6OaDTKlStX+Oijj4jFYiwwL+tjQ7XmwllQniPwe  
Dx6WxAIBHA6nVitVorFlul0mkQiweLiItPT05sG5+rBgRJB0zTcbjcOh4MXX3yR1157Db/fj9vtpqGhAU3TKBaL  
pFIplpaWiEaj+sBcvQSAAYaCiOBwOGhqaqKnp4fBwcFtr8tkMiQSCdLpNJlMpupjQ0/iQIlgs9no7e0lEAjQ3t7+hX  
AVgFwux/j4OLdu3WJqaqpmk/mP48CJ8PTTT9PX10cwGNz2AedyOYahH7l27RqRSKSulVCZAYFCeVyoubkZn  
89Ha2srDocDQBcin8+TSCSIxWLE43GSySRa2v1NFvnQlght9sJBoMEAgF6e3sZGBjQI+jKrK6uMjIywvz8PJOT  
k8zNzRmiFMABEcFms+nuqNfrxeVy6UMTxWKRfD5PKpVifn6ezz//nEQiQT6fr7PV/+dAiNDV1cW7775LMBjk  
9OnT+qQ9rI8Pzc3NEQqFuH5ZMg8fPiQUcTXX4C0cCBHcbjcDAwN0dHToAVxlstmsPls2NjbGgwcPDNMWIHni  
pI6IdlrIP0XknogMi8iPSulHROQfIjJW+m6pvrnbo2kaDocDh8OhD86VWVxc5NNPP2VoalhYLEY2m617v2ArO5l  
ZywM/UUr1A+eBH4hIPwYKeyl7RzabTV9pUyYajXLnzh1GR0dJJBLkcjld9A02spNjNvlgtnScEJER1l8ucpH1GT  
dYD3u5Bvy0KlY+gmPHjnH8+HH6+/ux2WzbBvGura2xvLxMNBolXAKo86XaBBHpAr4K/AsDhL309/dz8eJFur  
q6cDqd24qQTCYJhUL6KKkR2bEIItIE/Bn4sVlqvMx1yiPDxqoR8mK1WjeFrni9Xr0tKEdTp1lpVldXicViZDKZu  
g/SPY4diSAiVtYF+L1S6i+15B2FvVQ65EXTNPx+Px6Ph+7ubs6cOaOPkhaLRQqFAv18npGREUZHR7l9+zaRSIR  
UKmVYEXbiHQnwW2BEKfWbDafqEvYilthsNux2Oy6XC7fbvakqKgsRiUSYnp5maWlJ94iM1iCX2UIJ+AbwPe  
CuiAyV0n5GHcNeGhsbcbclcNDU10dzcTGNjox5NnUwmSafT3Lx5kw8//JBYLMbq6ur+FkEpdQN41NqhuoS9aJq  
G1WrVS0R5dU2xWGRtbY1UKkUoFGJoaOjJf2YAzIWDBsAUwQDsSxHKC/nK8wOpVMqw9f1O2HciFIItFYrE  
Y8/PzhElhxsbgCIfDhhqa/rLsy1HUXC5HJpMhFosRDodJp9N6NEUkEiGZTFZ8hWU12ZfwCs/cL/fz9GjR/XIa1g  
XKJ/PMzU1xezs7BP+qeZs+w68fSnCPsZ8EaFRMUUwAKYIBsAUwQCYIhiAWvcTloBU6Xu/4WfvdP/YLrGmL  
iqAiNzazk0zOtW026yODIAppgGohwjv1SHPSlA1u2veJph8EbM6MgA1E2G/7E5Y19jbcRbUNT+s77kzAZwEGoH  
/AP21yHsXtgaAs6VjN+u7KvYDvwYuldIvAb+qVJ61Kgn7ZndCpdSsUurfpeMEsDH2tiqvnKuVCNvtThisUd67pla  
xt2bD/Ai2xt5uPKfW66SKuZW1EmFHuxMahcfF3pbOP/aVc1+WWomwb3YnrEvsbQ29jldZ9zQmgJ/X2wt6jJ2Dr  
Fc1d4Ch0udVwMf6iqQx4ApwpFJ5mj1mA2A2zAbAFMEAmCIYAFMEA2CKYABMEQYAKYIBMEUwAP8Dp  
Z93d9dbd4EAAAAASUVORK5CYII=\n"

```
},
"metadata": {
  "needs_background": "light"
},
{
  "output_type": "display_data",
  "data": {
    "text/plain": [
      "<Figure size 432x288 with 1 Axes>"
    ],
    "image/png": "iVBORw0KGgoAAAANSUhEUgAAAGEAAABiCAYAAABAKr0NAAAABHNCSVQICA  
gIfAhkiAAAAAlwSFlzAAALEgAACxIB0t1+/AAAADh0RVh0U29mdHdhcmUAAbWF0eGxvdGxpYiB2ZXJzaW9u  
uMy4yLjIsIGh0dHA6Ly9tYXRwbG90bGliLm9yZy+WH4yJAAANukIEQVR4nO2dW2wbV3rHf4ccDu+kRIqUSd  
m6MLIc27KjOuu6QByjQdOg2BTI5mWxG6AoggL70gIt0Ica7UNft33oU58CdJEWcXoB2iCblxTNpnViwGgc26o  
VS04ky5YsUuJNpKnhbXg5fZA4Kzm+yJJ4kcUfQJA8Ijnf6D/nnO+c858ZlaWkS3sxtTuALl0ROoKuCB1AV4QOo  
CtCB9AVoQPYlQhCiN8TQnwrhJgTQlzcq6AOGmKn4wQhhBn4DvhdYAm4CvxUSjm9d+EdDHZTE34TmJNSzk  
spdeBfgLf2JqyDhbKL7w4A9ze9XwLOPekLQoiDPjxPSSkDDxfuRoRtIYT4GfCzZm9nn7DwqMLdiBAFjmx6f3ij  
bAtSyveA96BbEx7HbvqEq8BRlcsIEEIFfgL8cm/COljsuCZIKatCiD8B/hMwA7+QUt7as8gOEDtOUXe0sW5zdE1  
K+YOHc7sj5g6gK0IH0BWhA+iK0AF0RegAuiJ0AF0ROoCuCB1AV4QOoOmzqO3CYrFgsVhQVRWHw4GiKK  
iqiqIoKlQc2Ww2Plsul8lms1SrVWq1G1JKVFXFYrGg6zqFQoFarUa5XKYZMwzPpQhCCPr6+vD7/Rw5coTx8XE  
8Hg/Dw8O4XC76+vpwu93G5xcWFvj000/JZrNomkalUmFgYIBgMEg0GuXmzZtomsbS0hKIUmnP433uRFAUBZ  
PJhMfjIRAIcOjQIUZGRujp6eHo0aO4XC6CwaAhghACm83GzMwMHo+HbDaLrusMDg4SDocBiEajmEymLbVn  
T2Nuyq+2CVVVGR0dpbe3l1dffZUzZ87Q29tLOBzGarXi8Xgwm81ks1lisRhWqxWr1YqiKLzxxhvUajV0Xader+  
NyuXA4HAwODuJ2u1lcXGRpaYl8Pr/ncT9XIiKQn9/P+FwmlmJCS5cuIDNZsPpdCKEQAhBtVolFouRSCSw2+0  
4nU5cLhcnTpxAUdb/HUII4zdVVUXTNEwmEzabrTlxP+0DQohfAL8PJKSU4xtlPuBfgWHgHvBjKWWmKRE+P  
T6sViter5fe3l5eeeUVRkdHGR0dxW63o+s6sVgMTdOYm5sjl8sxNzdHIpEwasLhw4e5cOEcxQ8Xv9+Pw+Ewfr9  
YLBKPx0mn01Qqlabsw3ZqwwvA3wP/tKnsIvArKeXPN/xGF4G/2PvwnowQApPJhMPhYGBggIGBAV5//XUmJi  
ZQVRVVVcnn8ywuLhKNRvn4449ZWVlhbM6OZDJpZEmnTp3C5/MxMDCA0+ncIkKhUGB5eZIEItE+EaSUxw  
ghhh8qfgv47Y3X/wj8D20QweVy4fV6CQaDvPzyyxw6dAifz4fFYqFcLqNpGvfv32dycpJEIsHy8jKpVlPCoUCIU
```



FutxtHv8/nw+v1oigKUkpqtRq1Wo1cLmc0X9VqtSn7sdM+oV9KubzxegXo36N4nolwOMypU6c4fvw477zzDj6fD  
7fbjaLoRKNRrotEoV65c4YMPPIcXy5HJZKhUKlSrVer1OoFagJMnT3L69GnGx8fx+/1Gv1AoFCgUCty9e5crV66  
QyWSa0inDHnTMUkr5pGLZLheHA4HFouFQCDa4cOHjZze4/FQKpUolUokk0mWlpaMpqRQKFAqlajX61t+p  
7+/H7/fj91uR1XVxj6haRrpdJpMJsPa2hqFQmHLd/eSnYoQF0KEpJTLQogQkHjcb/fa8qKqKmfPniUSiXD27FnOn  
z+P2+3G6XRSKpW4ceMG8XicL774gmVxrpFKpcjlsbRv5nR0VHeFPNN+vv7sdvtRnm9Xuf69etcvnyZmZkZVld  
XKZfL1Gq13Yb/SHYqwi+BPwR+vvH88Z5F9ARMJhMWi4VwOMzY2BjHjh3j+PHjmEwm6vU6hUKBeDzOwsI  
C3333HVNTU1QqFXRd3/I7jXTV6/UyPDxs9AWwLkCtViMej3P79m2WlpYol8tN6w9geynqP7PeCfcJIZaAv2b9n  
/9vQog/Yt1V9uOmRbiB2+3m5MmTBINBXnvtNU6fPk1/fz/1eh1N01hZWSGZTPL5558zOzvL/Pz8945es9mM2W  
ymv78fr9fL4OAgPT09OJ1OTCYT5XKZW7duEY/HuXr1KtPT06ytrTWtBjTYTnb008f86Xf2OJYn4nA4eOmllxga  
GuLcuXOMj48bR62maSwsLBCNRrl69Sq3bt0yOuAGQgjMZjOqqhoDulAohNfrRVVVTCTYtuq4zMzPDnTt3mJq  
a4s6dOy3Zt44fMTfmbFwuFyMjI0QieWPeR9M0MpkMi4uLXL58mZWVfVKp1Jb2X1EUbDYbbrebF198kZ6eHs  
bGxggGg4yOjqIoCuVymUQiQTqd5vbt28zOzrk6utqyfex4EcxmM3a7Hb/fz9mzZxkbG6OnpwcwJalUitNZWSYNj3  
n//fdJpVLG3E8Dm81GX18fQ0NDvPvuuwWPdZM4OGikoxaLhQcPhvDNN98QjUa5dOkSMzMzFAqFlu1jx4vQG  
BU3jujG2gBALpdjYWGBlZUVI/30er1YLBZsNhuquLxeAgGgxw+fJhQKERfXx8ej2dLNqTrOul0mlQqhaZpFlv  
FpnED7MvRDCbzVgsFmOyzWRaXxCnp7mww8/JJvNYjKZCAQCnDlzhmAwSCQS4ciRI3i9XkKhEHa7nXA4  
jM1mw2KxbNlGNpvl66+/ZnFxxWQy2bTFm8fR8SLAr1NkK8mEyWQyZjl1XUfTNKrVKh6PB6fTycDAAKFQi  
BdeeIGrKRE8Hg/9/flYLBasVqshIKwPyqSUIMtl0um0MR5o9aUmOl6ExjOpVIhn8+Tz+ex2WwoisL58+fp6+uj  
VqtRr9dRFIVAIIDD4cDj8eByuYB1sSqVCuVyGSGEMeJulCWTSaanp4lGo2ia1vJ93BciNFJRXdcpUpYLBUR  
TGmrDd/9mEKhQIPHjXASmnUpsb6cWPdWNM0lpeXicfjrdw1g44XoV6vG0frZ599xuzsLOfOnSMSiRiL9tVqlX  
w+j67rJBIJ8vk88XicVCpFsVhE0zRcLpex0ma327Hb7aTTae7du8fi4mLTpqm3Q8eL0JhSXlI4ZNPPiEQCODz+Q  
iFQsbSpK7rZLNZ1tbWuHHjBolEguvXrzM9PU25XKZQKBij40kggs/nAyCZTDI1NcX8/HxXhO1QrVbJZrMATE  
5OUq/XUVUVq9VKuVwmk8lQLBaZm5sjk8kQi8WMrKmRsnq9XjweizFb2uhnSqVSyzvzewbEXRdN6amFxcXs  
VqtRtbU6Dfq9TqVSSXoyCuVCn6/n+HhYcLhMEePHiUSiWA2mxFCUCwWSSaTZLPZpk1Tb4d9I4KUkmq1SrV  
apVwuP9P3GsavxqORmuq6ztraGsVisStCM2lkQ41RdkMAKSXwWlyvvvrK8Bq1i+dehMbArvG8ue1vZFHNXDX  
bDk81BAshjggh/lSIMS2EuCWE+NONcp8Q4r+EELMbZ73ND/fZaVhcFhYwnqkZayXbcWVXgT+XUp4Afgv4Yy  
HECX5tezKk/GrijfceRz+e5f/8+sVisrU3Ok3iqCFLKZSnI9Y3Xa8AM6xcXeYt1uwsbzz9qVpC7wW63c+jQIQKBw  
Pcm7jqFZzo/YcN/9BvA/9Ihtpen4fV6OXbsGFIBKvV2u5wHsm2O2YhhAv4d+DPpJS5zX7N9Jle2n2VF0VRcDgc  
2Gy2LTOoncS2ohJCWFgX4EMp5X9sFMc37C48yfYipXxPSvmDR11OoBXYbDYCgcAWY1ensZ3sSAD/AMxI  
Kf9u058athdooe1lJ2xeh9hcgze/bifbOTReAf4AmBJCTG6U/SVtsL3sBE3TmJ+fN059etR4od1sx/JyGXjcIdNS28tO  
KJVKpFlpgsHgFv9Qp9QCOABnb5ZKJWMrf3V11ZiikFia5zVsXrduBwdChHg8bjj0GuvIsN5p+/1+3G53W0Xoz  
HShCei6TjQaNdJVp9Njb28vo6OjOJ1O47yFh53breDAiJDL5bh06RLz8/OGA2NsbIy3336bb7/9ltXVVVKpFPF4n  
GKx2NLYDowI1WqV1dVVRfYruVyOYrGIqqoEg0EymQx9fX3U63UymUzLV9oOjAiFQsGwtUxMTOB2u41zm  
51OJ5qmEYvF+OijjiVSsbZ/a3gwIjQqAmVSoV4PE48Hsdut+PxeNB1nUgkgqqquFwuFEUxbDat4MCIsHk588sv  
v+TevXtMTEyQTqex2WwMDw/jdrsJhUisLy/z4MGDIjkwDpQIjcX/a9eucfPmTXK5HDabjaGhIY4fP47H4zFS1lZ  
2zgdGhM00HNeNk0ru3r1LIpEwLDO5XK6lq3AH+uK0DQefEMI4f7lxlXDDLHDHPLitAeyJjRoWGjaTatFSAH5  
jef9Rh+7j3voUYUtbY4AhBBft2uBZzc0M+7nfgJvP9AVoQNohwjtWGbe0HT4m55n9DI+3Sbow6gZSLs17sTtsV7  
u9kq3qwH6/fcuQNEABX4P+BEK7a9g1hDwJmN127W76p4Avhb4OJG+UXgb/Zqm62qCfvm7oTt8N62SoRH3Z1  
woEXb3jGt8t52O+bH8LD3dvPf5HqbtGdpZatE2NbdCTuF3Xhvd0KrRNdg3dydsi/e2hVnHD1nPNO4Af9XuLoGJcZ  
5nvam5CUxuPH4I+Fk/I2kW+AzW7dU2uyPmDqDbMXcAXRE6gK4IHUBXhA6gK0IH0BWhA+iK0AF0RegA/h/  
aZk1vGGh6JgAAAABJRu5ErkJggg==\n"

},

"metadata": {

"needs\_background": "light"

}

},

{

"output\_type": "display\_data",

"data": {

"text/plain": [

"<Figure size 432x288 with 1 Axes>"

],

"image/png": "iVBORw0KGgoAAAANSUhEUgAAAGEAAABiCAYAAABAKr0NAAAABHNCSVQICA  
gIfAhkiAAAAAlwSFlzAAALEgAACxIB0t1+/AAAADh0RVh0U29mdHdhcmUAAbWF0cGxvdGxpYiB2ZXJzaW9u  
uMy4yLjIsIGh0dHA6Ly9tYXRwbG90bGliLm9yZy+WH4yJAAAPtEIEQVR4nO2dW2wbV3rHf4cccsT7VaRIkZR  
k2Za1lh05LmlkWAf4iCFU2Cbl0U3LyLSYJ8KtEafGrQPfd32oUCAPgXooi5QtF2gRRoECOrNpZEXMBprnVR

2bMWyLtaNpESJd/HO0weJU8m3SDIpUzZ/AEHqkJz5NP855zvfd77hCCkLHZ4uuqdtQIeOCG1BR4Q2oCNCG9A  
RoQ3oiNAGPJEIQojfE0J8L4S4K4R4v1lGPW+I/cYJQgg9cAd4A1gErgE/k1Leap55zwdP0hNeAu5KKWeklGXgX  
4GfNMes5wvlCb7bCyxs+3sROPe4LwghnvfwPCGI7L6/8UIE2BVCiJ8DP2/1fg4J9x7W+CQiLAHhbX+Http2IKX8  
EPgQOj3hUTyJT7gGHBNCDAghjMAfAh83x6zni333BCIIvQjxJ8B/AXrgl1LK75pm2XPEvqeo+9pZZzj6rZTyd+  
5v7ETMbUBHhDagI0Ib0BGhDWh5sHYEEIghNjRJqXkoCYtz6ULiqKg1+u1h9VqJRgMYjAY6OrqQgjB7Owsi4  
uL1Ot16vV6a+1p6dbbFEVRMBgMGAwGjEYjHo+HEydOYLFYsNvt6PV6SqUS0WgUoCPCk6IoCqqq0tXVRSg  
UwmQy4XK5MJvNWCwWLBYLDoeDSCSifU4IQS6Xo16vk0gkmJ2dpVartc7Glm25TVBVFfbfjd/v580338Tv99  
Pf34/H48Hr9eLz+dDpdOh0m3MUnU5HvV7H6/XS19fH9evXWVhY6liwFwwGA3q9HovFgslkwul0EgwG6e7uJh  
KJaAfe5XJht9vp6uoCNocIQSKsnlInE4nPT09uFwuTCYTUkoqlUpLnPUzJYJer8fj8WCxWDhz5gzDw8OEw2FG  
R0cxmUy43W6MRiOqqmrjfjKZpFqtUi6X0ev1eLeTCYTFx19OBwOcrkcY2NjJJNVldXqVQqTbf7mRBBR9drTt  
bpdOJwOOjt7WVgYID+/n6OHZ+O0WjEYDBoU1EpJblcThOhVCphMBhwOp0AmEwmhBDYbDZMJhP5fF4bsp  
rNoRahMcvx+/28/PLLuN1uRkZG8Hq99PT04PP5sFqtdHV1odPpEEIgpSSTyVAsFvnNb37DZ599RrVaBcDj8fDu  
u+8yPDys9RabzYbVaqVQKHREeBg6nQ6j0YjX62V0dJRgMMhLL72E3+9HVVUMBsMD35FSUiwWyWQy3Llz  
h88//5x6vY6iKASDQd5++20ALYZQVvXb1v0BXbP4QRGEEL8Efh9YkVKObLW5gX8D+oE54KdSymRLLHw  
MLpeLUCjE0NAQp06dwufz4XQ6MRqND5y1tVqNjY0NCoUCY2NjTE1NMT4+Tjqd1gK2p8VuesI/An8P/NO2tv  
eBz6WUv9iqN3of+Ivmm/d4vF4vw8PDjIyMcPbsWdxu9yPP11qtRjqdJplMcvnyZb788ksymQzJZBKTyYTzBD5g6/  
+fHxRBSjkmhOi/r/knwO9uvb4E/DdPQQSLxUIgEMDj8TwwXFSrVSqVctVqlUKhQC6XY3JykkQiQTQaJZ/PUy  
qVkFKi0+kwm82YzeaWjfuPY78+wS+lJG69jgH+JtmzJ3p6ejh79qyW99IOPp8nm82STCZZXFxkeXmZjz76iOXIZ  
RYXF0mlUlo6QIVvfD4fPp8PVVUP/P94YscspZSPW7ZsZclPvKkWCxqB7xcLlOpVKjVaagyvr5PJZFhX2dhY  
YFoNEo0GiUej7OxsEjAtbpdKiq+lBfchDsV4S4ECIgpYwKIQLAyqM+2MqSl++++45Lly4RDAAznZ1FURRmZ  
2e1g59Kpcjn86yvr1MsFllZWaFUKj0QcCmKgs1mw2azodfrm2nirtivCB8D7wK/2Hr+z6ZZtAfW1tYol8tks118Ph+  
KonDz5k2SySSJRIJ0Ok2xWCSXyz023aDT6bRgry17ghDiX9h0wl4hxCLw12we/F8Jlf6Yzaqyn7bSyEfREGbHY  
ErV64AkEgkKJVKFAoFSqUstVrtB/M9jQxrb2+vlks6SHYzO/rZI956vcm27JlKpUKlUiGfzxOPx/e9HVVV8fv9+H  
w+jEzJey3cHYc6Yt4NdrtG6oa4/32qayUksHBQTweDw6HQ5tl5fN5CoUCq6urrK6ukkqlWpbOfuZF8Pl8nD9/nq  
6uLlRVRQixY9yv1+v09PTQ19eH0+IEVVWklKytrGLxZiZmWfMzoZ8Pq/lmJrNMMyNCY7G+sZ7QyH4ODg5y  
5MgRurq6MBgMWiIP0HyFy+XC4XBoUXOIUiGRSDA9PU08HtcCv1Yt/D8TljRmNwaDQcucnjt3jtOnTxMOh3n  
hhRceGI4aGVUpJYqiYDKZALQ1hq+++opPPvmEeDyuRdat4ICL0BhaDAYDNpsNVVXxer3Y7XYikQhHjx4IEA  
gQCATQ6/VahNzIkN5f1IKv1ykWi1QqFdLpNPF4nHQ63VnofxiNlcVut+Nyuejr6+PixYs4nU5tZczr9eJyuTAajeRy  
Ocr1MrFYjGq1SigUwuVyaWI0kFliHECv19Pb28vo6Cjz8/Mkk0ktEm8Fh1KERg8wm8243W6OHj3KG2+8sSOV3  
RjHy+WYFrAtLS1RqVRwOBxa6vr+4KyxbZfLRSQSIZ/PoygKtVqNer3eWWNuVEU0xv0zZ85w7tw5QqEQ3d3d  
Klrc5OQk2WxWS1tks1ktgMtkMuj1ei11bbVadyT+hBAyJUb0ej1DQ0NYLBasVitLS0uk02mi0SilUqnpYhwaERp  
nqNFoJBgMEggEuHDhAu+8847mdNPPNBMT8zZmZDA9Pc3i4iLxeJzZ2VArbhrcHCQYDCITqfDzRpt2EfDQY  
+MjHDy5EksFgt3794lFouRTqe1WdJzJ4IQAlVV6enpwW63c/LkSSKRCKFQCIPBQK1W25ExnZubY3l5mUQiQ  
T6fB8BsNnP8+HG6u7vp6enBarViNBq15c5ElkG9XtcKAholMx6Ph5GREfx+P/V6nVQqxcrcKtIs9oESyYZj36vva  
HsRGo7S7XZz4cIFQqEQr732GkNDQ5hMJnQ6Hel0msnJSZaXlxbkG+PWrvvk83k2NjZQFAWLxUlEuG9995j  
YGCAoaEh/H4/UkpqtRxeJwvviCUqlEIBDAarVy7Ngx+vr6OHbsGMFgkEwmw82bN1lbW2NsbIw7d+5o/qbRK  
yqVCKtLS5ruw6XtRTAajVitVtxuN8FgkN7eXrq7u3G73RSLRVKpFIIEguXlZaLRKMIkkkwmo0W3JpOJ7u5ubara  
09OjDTmFQoFsNks0GmVxcVFL+FmtVmw2G2azGUVRMBqNWCwW/H6/luwrFouUSiVNHq9zsbGxo7et1vaV  
oRGQNXx18scr7xCOBzmrBfewufzYbfbKRAl3Lhxg/HxcalRKNeuXSOVSjEzMO0hUMDj8eB0OhkeHub111/H7  
/dz6tQpHA4HxWkReDzO+Pg4V65cYWVlhW+++YZyuayVyAwMDBAOhwkEAgwNDWG1WjUhg8Gg5qDr9b  
qWzY3FYnzwwQesr6/v6X9tWxEaM6GGIw2Hw/T19eHxeCgWi5TLZVZXV719+zaxWIzbt29rSbeGg3W5XITDY  
U6fP03b7dbihkwMqYaTYX5+nm+//Za1tTXu3r1LpVLBZDJhMBj15XKSra2RSqWwWCx4vV4ikQh2u53u7u4ds6p  
CoUAikcBqte6rYGA36wlhNist/IAEPpRSftDKshchBOFwmN7eXs6ePcurr76qJdc2Nja4du0ac3Nz3Lhxg4mJCSqVi  
jbkhMNhHA4HR44c0c7k/v5+KpUK169fJ5vNcvv2baLRKN9//z3T09MUCgVt3aFcLlOtVonFYuRyOWKxGHNzc  
7jdbu15YGAAt9ut2RuLxbh69aq2hLpXdtMTqsCfSymvCyFswG+FEL8G/ogWlb0IIQgGg5w+fZrR0VFefPFFVFW  
IVCqxsBHBxMQEX3/9NXNzc0xNTWGz2RgcHMTlcnH+/Hl6e3sZGhqiv79fq9KLx+PcunWLhYUfRl69yszMDNl  
sllQqtfOf3flliUSCRcIBwMTEBC6Xi3Q6jc/nl5/PE4IEtO9MTU3x8ccfk0gkWF155ErvI9nNok4UiG69zgohbrP54yIt  
K3sRQhAIBDh16hTheBhFubQ4QVEUQqEQvVwOv9/PwMAANpuNcDiM3W5naGhIy4oqikl6nSYWixGNRrlx4  
wbLy8vE43Hy+TzlcnnXNpVKJZaWlshmswDMzMx07zWmw7lclb+PjT35hK36ozPA/9DCshedTsfw8DAXL17UZ  
iiNdoPBoInTyP2YzWb8fr+Wxm74E51ORywW4/Lly8zPz/Ppp5+ysrKi5YH2EnBtbGxw69YthBCMj4/vSHfUajWt  
bH4/QdyURRBCWIF/B/5MSpm5b3XqkWUv+y152X4gt21Lu/agkYI2GAwoiqKN541pZrFYpFgscvfUxebn53cUfO  
03K9oYqppdHr8rEYQQBjYF+Gcp5X9sNe+q7GU/JS9SSgqFAul0GthcotTpdNqZ393djcvl0rKpjWatl8tx79490uk0  
09PT3L3Tyv+asQUrU5L74fdzI4E8A/AbSn13217q6VIL4VCQXOajYv5tpe3w+YwUK1WyeVyrKysaNPOZDLJ1  
NQUs7OzWt1RvV5v6SVPT8IP/sCIEOLHwBXgBtA4jf6STb/wKyDCVtmLIPKxUcpue4IQgpMnT2qLMidOnMBs  
NuP1eIEURsvgWlhY0NZ/GytgqVRKK33PZrNaOvsgr0t+DA/9gZG2/ZWXXjUBoVCI0dFR7HY7/f39qKpKNpul

WCxy8+ZNxsfHKZfL5PN56vV6S9eCm8BDRWjbiLnhBNfX15mcnERVVRYWFnb0hlazrdVqLV10aTVt2xPu+9  
5DrztokyFmLxyunrCdQ3iw90TnV17agI4IbUBHhDagI0Ib0BGhDeiI0AZ0RGgDOiK0AR0R2oCDjpgTQH7r+bDh  
5cnt7ntY44HmjgCEEOMPy5+0O620uzMctQEdEdqApyHCh09hn82gZXYfuE/o8CCd4agNODARDsvdCYUQYS  
HEI0KIW0KI74QQf7rV7hZC/FoIMbX17GraThurVq18sHnPNWngCGAE/hf40UHsex+2BoAXt17b2Lyr4o+AvwX  
e32p/H/ibZu3zoHrCobk7oZQyKqW8vvU6C2yvnb209bFLwB80a58HJcLD7k7Ye0D73jcHVnvbrA09a9xfe7v9Pbk  
5JjVtWnlQIuzq7oTtwuNqb7fef+xPzu2VgxLh0NydcBe1t9Ds2tsDnHVcZHOmMQ381dOeBT3Gzh+zOdRMAN9u  
PS4CHuBzYAr4DHA3a5+diLkN6DjmNqAjQhvQEaEN6IjQBnREaAM6IrQBHRHagI4IbcD/ATrflP XVruRgAAA  
AAElFTkSuQmCC"

```
  },
  "metadata": {
    "needs_background": "light"
  },
  {
    "output_type": "display_data",
    "data": {
      "text/plain": [
        "<Figure size 432x288 with 1 Axes>"
      ],
      "image/png": "iVBORw0KGgoAAAANSUhEUgAAAGEAAABiCAYAAABAKr0NAAAABHNCSVQICA
gIfAhkiAAAAAlwSFlzAAALEgAACxIB0t1+/AAAADh0RVh0U29mdHdhcmUAAbWF0cGxvdGxpYiB2ZXJzaW9u
uMy4yLjIsIGh0dHA6Ly9tYXRwbG90bGliLm9yZy+WH4yJAAAIUIEQVR4nO2d328bWRXHP2f8K3aSST04Sa
MmaaBdtUqINiQVtAJpkWC11b6UJ0Qf0D4g9QUkkHiggn8AeOAPqMSKPiAQEKj0oRKCFYgiIdRQbYfTrLJbZd
s0ifPDcR27tmN7Dg+2g5M6jXFsz8SejzTKzPWM7tF8c+89594zM6KqeDiL4bQBHP4IrsATwQV4IrgATwQX4Ing
Ao4kgoi8LSL/EZGPRORWq4zqNaTZOEFefMA88BawBDwAbqq49aZ1xscpSV8DvhIVZ+o6g7wK+B6a8zqLfx
HuPYU8KzmeAn4/OsuEJFeD883VHV4f+FRRGgIEbkJ3Gx3PceET+oVHkWE58BEzf4pWwPqnoBuA1eSziO4w
JD4A3ROTTiHIEvg7cbY1ZvUXTLUFViyLybeD3gA94T1U/bJlPUTTLmpTlXnd0T9U9cr+Qi9idgGeCC6g7S6qU
4TDYfr6+vD7/ft19QFQLBaxbZt0Ok0ul8O2bdywtiVlhiGweXL15mZmWFycpKZmRls22Z9fZ0XL15w9+5dHj16
xMuXL0mn006b270ijIyMcP78ec6dO8ebb76Jbds8f/6czc1NZmdnmZ+fp1AoOG0q0GUiGIZBf38/4XCYS2fPMjMz
w8jICIZhYBgGlmXh8/kYHh5meHiYUqIEMpl0vEvqKhFEhEgkwuDgIBMTE0xPTxMMBjGMsv8xNDSEz+fDsi
wsyyKVSjlscZmu8o5UIUKhQC6XI5lMsra2RiqVwrbtV84VEQcsrE/XiZDNZkmn0ywwL7OwsEA8Hq8rgpvoKhE
ASqUSxWKRfD5PNptlZ2fHaZMOpavGhGp3pKpsb2+zsbGBZVmOD7yH0XUtQVVRVUqlErZtu74rgi5rCSJCM
BgkFAoRi8U4deoUlmW5ahCuR9e1BL/ftZAYZGBggGg0Sn9//EXQUteE5E1Efl3TZklIn8QkYXK32h7zWwME
cHv9+P3+4IElpimSTgc3iOCYRicOHGCKydPEovFME2TSCTiqFCNtIsfA2/vK7sFvK+qbwDvV44dpypCMBikv7
+foaGhujfYsizGx8cZGRkhGo0yMDCwG9A5waE1q+pfGMS+4uvAncr+HeCrLbarKareUT6fZ2tri5WVFba2tvYMz
n6/n9HRUc6cOcPk5CQjIyOYpumoCM0OzKOqulLZXwVGW2TPkahOU2ezWebm5rAsiwsXLnD69G18Ph8AgU
CAK1eucOnSJalRKLlcjqdPn7K8vOzYhN6R5deyE36gIy4iN0VkvRmj1pXI9i2vTsxt7KyQjKZfMVNDYfDmKa
5O9kXCoUcHROabQlxERIT1RURGQPWDjrRiZQX27Z5/PgxS0tLGIbB9evuTgxstiXcBd6t7L8L/K415rSORCLB
4uli6+vrelqCiLjOZW3ERf0l8DfgnIgsicg3gR8Bb4nIAvCVyrErqd70/TfeTWIc2h2p6o0DfvpYi21pG7U3313zSF0X
MdejOp/kRgGgB0Q4SAA3idJVE3iN4JYbX0vXt4TjgCeCC/BEcAGeCC6gJwbmapyqnsCNNM0GR8fJ51O4/c7d
yu6XoT9EXOtdzQ0NMTU1BTJZHJ3ltUJero7ikQijl6OEovFGBwcJBKJOLKu0PUtQVV3U+D3xwijo6NYlsXOzg
4TExOICPF4nGw221Ebu74lFItF0uk0mUyGUqm0J4L2+/2Ew+HdpdChoSECgUDHbex6EVZXV7l/z4PHjwgk8n
UPScajXL16lWuXbvGiRMnOmxD3RHmUyG5eVIDMM4cPkyFAoxNjZGsVgkGAX22MLG1hMmRORPlvJYR
D4Uke9Uyl2Z9rKfXC7HxsYGiUSCYrHotD11aaQ7KgLfU9Vp4CwLrGZxqVpL/spFApsbW2RSqUolUpOm1OX
RhZ1VoCVyv62iMxRfrnIdeBLdPuAH8Gvt8WK49AKpVifn4e27bZ2trCNE1CodCeAbi/v5+zZ8/upk+urq6Sz+c7l
31R6y0ctgFTwFPABJl15VJ7/JrrtdObYRgaCAT04sWLeu/ePX3y5ImmUiktUq7W7FY1J2dHV1cXNQbN27o1NS
UmqbZDntm692XhgdMERkAfgN8V1VTteG/qupBmRROv+WlmpldfV4hm82+MjYYhoHP5yMQCODz+TAMo6P
rzw25qCISoCzAL1T1t5XieCXdhdelvajqbVW9Uu91Ap2kUCgQj8dZXI5+xVWt/kc69VxzI96RAD8D5IT1pzU/uT7
tpZZSqUQmk2F7e5tisfjKsqeTK26NdEdfAL4B/EtEPqiU/YBysuvKykwnwBfa4+JrSGTyfDw4UPW1tYYHx9nY
mLi8Is6RCPe0V8pD7z1ODZpL/l8nmfPnlEoFFfzxFH8tXR8xV6nmpwYCATY3N0kkEvT19RGJRJw2rXdEKBQK
JBIJvJW1tTXi8TixWMwToZOoKrlcju3tbebm5ggEApimuTthJyJsbm6yurpa141tJz315q/qOy4GBgYIhUK7x1Vs2+
bFixfk8/luat13/zVMY0B/he4JZNJp03ZQ9evJxwHPBFcgCeCC/BEcAGeCC7AE8EFecK4gE7HCRtApvL3uBHj6
HafrlfY0YgZQERmnV7gaYZZ2u1lRy7AE8EFOCHCbQfqBAVts7vjY4LHq3jdcQvomAjH5euEjuTe/j8ZeM1ulL+
58zHwGSAIPAKmO1F3E7aOAZcr+4OUv6o4DfwEuFUpvwX8uFV1dqolHJuvE6rqiqo+rOxvA7W5t2155VynRKj
3dcJTHaq7aURkCvgs8Hfa+Mo5b2A+gP25t7W/ablPaplb2SkRGvo6oVs4Su5tM3RKhGPzdUJHcm876HW8Q9nT+
```

Bj4odNe0Gvs/CLlrufwAeV7R3gU5SfSFoA/ghYrarTi5hdgDcwuwBPBBfgieACPBFcgCeCC/BEcAGeCC7AE8E  
F/Bf9N/SrABW/egAAAABJRU5ErkJggg==\n"

```
  },
  "metadata": {
    "needs_background": "light"
  }
},
{
  "output_type": "display_data",
  "data": {
    "text/plain": [
      "<Figure size 432x288 with 1 Axes>"
    ],
    "image/png": "iVBORw0KGgoAAAANSUhEUgAAAGEAAABiCAYAAABAKr0NAAAABHNCSVQICAgIfAhkiAAAAAlwSFlzAAALEgAACxIB0t1+/AAAADh0RVh0U29mdHdhcmUAAbWF0cGxvdGxpYiB2ZXJzaW9uMy4yLjIsIGh0dHA6Ly9tYXRwbG90bGliLm9yZy+WH4yJAAAN3klEQVR4nO2dW2wbV3rHf4fDy/BO8SKSLi0rsgLf5AdFjZKgjVGgNlAvCmz8sug+NLvAAvtUoAX6UKN96GvahwIF+hSgi6ZA0QvQBt2XpNgGKYoygeF4sXW8lnyRZUMUKVKUSEq8D8nTB4IT3UVJJEXG/AECR2c4OmfmP+ec7/vOpxkhpWTA2WI46wYMGIjQEwx6AEGlvQAAXF6gIEIPcCpRBBC/K4Q4okQ4rkQ4k67GvW6IU7qJwghFOApcBOIAfeBH0opH7evea8Hp+kJM8BzKeULKWUV+Gfg++1p1uuF8RTHRoDFbb/HgHcOO0AI8bq752kpZWB34WEaAkhxE+Bn3a6nj7h1X6FpxFhCTi37ffoVtkOpJQfAx/DoCccxGnmhPvAm0KIN4QQZuD3gZ+3p1mvFyfuCVLKmhDiD4H/BBTgZ1LKX7etZa8RJzZRT1TZYDh6IKX8jd2FA4+5Bxi0AMMROgBBiL0AB131s4SIYT+KYTAYDjZPSelRepJvV5vZ/N0vLMiGAWGnE4nZrNZv/BOpxO/38/Q0BAzMzO43W79orZCLpcjHo+TTqe5e/cumUyGRqPR8vGt8J0UwWazYTAYUBSF4eFhJiYmGBsb48MPPyQajR5LhMXFRR4+fMjz58959OgRuVzuWMe3Ql+LYLFYUFUVq9XK8PAwNpuNCxcu4HK5MBgMGAWGvF4v0WiUQCCA3W4/dh12u51IJEKj0WB6eppAIMDLly9ZXV2IXq/TaDROfR59LYLdbicQCDAYMsK7776L3+9nenqa4eFhfTiy2WwMDQ2hKApms/nYd7HH48HpdBIOhymVSsTjcT799FMKhQLVapVKpXLq8+hrEZxOJ9FolJGREc6d04fX68Xn8+HxePRJWVVVFXVJ+WmAK0KIYTAADSiqirDw8NIKff4PFitVqSUAXEuXrzI7du3CYVCTE1NYbPZsFqtGI1GXQSDwaBvnwa73c5bb71FLpfjwYMHJBIJlpeXKRQKp54f+loEq9WKz+fd7/fj8/mwWq079kspaTQa+3aFGP3RWuar9s/d6MoCk6nEyEEdrsdVVUxmUxtOY++FmF1dZW5uTk0TWNynLHvkqlQqVSIZIM8uzZM2q12oEi2Gw2gsEgVquVkJZerbDZb184B+lyEfD5PIpFgaGhohyMlpUTTNMrlMisrK8zOzlKtVoHN4Wm3RePxeGg0GrpP0YoIXTVRhRA/A34PSEkpJ7fKvMC/AGPAS+AHUspM21rVlirK3z77bek02kqlcQOilcul6lWqySTSZ4+fbrH291+EW02G48fP8bn82G32zGZTJjN5h3DTbVaZXI5mUwmw+LiIslkko2Njba10UpP+Hvgb4F/2FZ2B/hCSvnRv7RHeBPT92aY5JJIeilUqiqr1793aEJRqNBolGg2KxyPr6+qH2vNFoxGq1EolEmJqalhAI4HK5dohQLpd58eIFiUSCly9fsrS0RK1Wa8t5HCmCIPJ/hBBju4q/D/z21vYnwh9zBi104znVapVCobCvCNVq9ciLZTAYcLlcuFwuzGYzRqNxT5yp0WhQKpUol8tomtY2Rw1OPicEpZSJre1lINiW1hyTpuNVrVbJZDI7rJrj+AMOh4Nlly4RiUTw+/36kLSder3OxsYGmUxGF6JdnHpillKw5Ytu5HyctJYjtFoxGw243A48P18DA0NYbFYUBRlj51aq9X15XK6CO3kpCIkhRBhKWVCCBEGUgd9sZdTxsLhMBcuXCASifD+++8TCAQIBAKYTKY9IuRyOb744gvm5uaIxWJtbedJF3V+Dvxoa/tHwH+0pzmdpemMKYqCyWTC7XYTDoeJRCJEIhHC4TBWq3WPw9YMT8RiMV69ekU+n29ru1oxUf+JzUnYL4SIAX8BfAT8qxDiJ2xmlf2gra3qAFarfPnz+Nyubh06RKhUIhIJMLo6Cgul4vR0VE9IrudUqlENpsllUpRLpep1+tt9RGgNevohwfs+p22tqTDqKrKG2+8QSgU4tatW1y+fBmPx4PP50NRFBRF2fe4crlMOp0mk8mgaVrbLKLt9LXH3HSqrFYrfr8fVVXu92YzeY933W73UxPT+Pz+RgdHcXj8WCz2fZMwvV6nXq9TjweJ5VKsbKywsLCAouLi6yvr59NT+h1VFXF4/EQDoeZmZnB6/Vy6d1IPB7Pnu86HA4uXryIw+FAURR93N899jfXCL755hu+/vprlpaWePz4Mfl8nlQq1VbTtElfimAymfSly9HRUUKhEGNjY7jdbkKhEC6Xa88xNpsNh8OBqqrA/v5D0yErFousrKwQi8VIJpNks1l9PugEfSeCwWDA5/PhcDi4efMmH3zwgW7lmM1mVFXdd3wXQuw7TG2nVquxLjIysok9+/f58svv9QDgVLKtoUpdtN3IsBmT1BVIUAgwPj4OA6HA6/Xi9F49OkIIZBS7rtm0Gg00DRND4M0Y06dmly305ci7Ecrq2fb40H7DUcWi4Xx8XGCwSCTk5PMz8+ztrZGLBbrqBCvVQbeUVaNoij4fD5GRkZ0521oaOjESWot0nc9QUrJ+vo6mqbx4MEDLBYLXq+XiYkJFEUhnU5TKpUOTNBqDkcAfr+fUCiE2+3m/PnzbVuuPC59KUilyOXY3H3711mZ2cJh8O89957CCF49OiR7lgdZc1MTk4yPT3N+fPnCYVCugjTu46ir4TYTvVapV8Ps/q6irz8/MoiklqSKXy7U0oSYSCZ4/f47RaKRWq3X1wm+nr0UolUpUKhWy2awe2dweWjjqomYyGZ48ecLa2ppu6p4FfS1Cc2Wtubp2XJrmaKfs/1bpaxFOS9PPGBsb07NJGfpmhIPyhk7yd5pJXMFgEI/Hc2AUtRu0sp5wjs1MiyAggY+llH/TrbSX5gVTVVW3YFKpFPi8/kSL7YqiMDY2hs/nY2ZmhuvXrxMKhfSY0lnQSk+oAX8ipfyleMIJPBBC/AL4MV1KezEYDKiqSjQaxWq1UqlUKJVKeprjVAUhWg0yvJ4OO+88w43b97EbDYfGVfqJK0s6iSAXNb2hhBils2Hi3Q07cXhcOhp7SMjI3g8Hq5du4bJZCKfz+uRzVbSWYxGIyaTiaGhIRwOB9euXePy5cuMjo5iNBp3rCk0Gg19sm9ud9p0PdacsJV/NAXco4NpL0II3Zu9evUqN27cwOfzMTk5iZSSWCzGy5cvkVlemflgNBqx2Wy4XC6uXr1KMBjk1q1bTE9PY7VadyxnNiOlmqbp1lOng3dwDBGEEA7g34A/llKu71oMOTD5SQpL0IIPB4PY2NjRKNRgsGgfhc3Gg28Xi+hUth8
```

Pn9k3qjNZsPj8eByuXjzzTf1DG6bzaZbRPV6nUqlgqZpZDIZfT1hY2ODYrHYGz1BCGFiU4B/IFL++1ZxS2kvJ0I5MRgMvP3229y+fVs3I5vha03TmJqawmQy6XPDYQQCASYmJnA4HEXMTGC323G73aiqqg9BhUKBhYUFstks9+7dI5FIcP/+fWZnZ6nVamcfyhabLf07YFZK+dfbdjXTXj6iA2kvLpdLnwucTqceyRRC6P+H1rx7D7tTQ6GQLkIzo6IZG2qO+YVCgXQ6TTqd5tWrVywtLZFKpSgUCu08pQNppSf8JvAHwLdCiF9tlf0ZZ5T2YjQauXz5MtFoVL+Ih2G1WvXk3ubwUyqV0DSNZDJJPB5nYWGBzz77jLW1NeLxOIVCgWw2243TAVqzjr4CDlox6Wjay353uMFgIBgMEgwezW7Y7ug1lyzT6TTz8/PMzs7y1Vdfkc1mO5bWchg96TFLKZmbm+Pzzz8nEolw9epVHA4H0WgUi8XS0t9oBvea8SVN01hbW6NcLjM/P68v5C8sLJBKpSgWi2cWSe1JERqNBg8fPiSZTHLx4kVKpRKhUAifz9eyCMVikVwup5uc+Xyep0+fkslkuHv3ri7E8vLyiZy+dtKTikgpKRALZDIZ4vE4s7OzrK6u6v8iGwgE9MnaYDCgaRrr6+vUajXy+TzVapVEIsHKyoo+9JRKJWKxGBsbGyQSCbLZLMVisWNpLMehZ5/81UzcNZvN2O12vF4v169fJxwOc+PGDa5cuaJn362uruqPPHjy5AmZTla5uTlevHhBuVzW40xNc7NSqejbXe4B+z75qyd7Avz/f9psXyuIx+NomkYsFsPpdGKxWLBLYLKyrtrbG4uEgulyMWi+IWTjKZ1EXo5Tem9GxP2HUcJpMJj8eD2WzG7/fvSGesVqtsbGxQq9UoFApomkahUKBUKulxoB5h357QFyJ8hXg8iLBXGYjQAWxE6AEGiVQAAXF6gG77CWmgsPXZb/g5fbvP71fYVRMVQAjxzX5mWq/TyXYPhqMeYCBcd3AWInx8BnW2g461u+tzwoC9DIajHqBrIvTL2wmFEOeEEF8KIR4LIX4thPijrXKvEOIXQohnW59Dbau0mf7RyR8237kzD4wDZuB/gSvdqPsEbQ0Db21tO9l8q+IV4K+AO1vld4C/bFed3eoJffN2QillQkr5y63tDWB77u0nW1/7BPigXXV2S4T93k4Y6VLdJ6ZbubeDifkAdufebt8nN8ektpmV3RKhpbct9gqH5d5u7T/0kXPHpVsi9M3bCVvIvYV259520er4HpuWxjzw52dtBR3Szt9ic6h5CPxq6+d7gA/4AngG/BfgbVedA4+5BxhMzD3AQIQeYCBcdZaQoQcYiNADDEToAQYi9AADEXQA/wMhoILkf/k7wAAAABJRu5ErkJggg==\n"

```
},
"metadata": {
  "needs_background": "light"
},
{
  "output_type": "display_data",
  "data": {
    "text/plain": [
      "<Figure size 432x288 with 1 Axes>"
    ],
    "image/png": "iVBORw0KGgoAAAANSUhEUgAAAGEAAABiCAYAAABAkr0NAAAABHNCSVQICAglfAhkiAAAAAlwSFlzAAALEgAACxIB0t1+/AAAADh0RVh0U29mdHdhcmUAAbWF0cGxvdGxpYiB2ZXJzaW9uMy4yLjIsIGh0dHA6Ly9tYXRwbG90bGliLm9yZy+WH4yJAAAHfEIEQVR4nO2d32sb2RXHP2dmJl1ISXadxMZwlbophmBCfpSILaRPaReWQNg+dh/KPizsQ1pooS+B/gNtH/oHBLp0H0r70kD3rbRLQymUsk3Ylq5N7V1jp67t2MaxHMDsNDM6fZBGVRzbUW1ZcyXNBwbNXFnMF391555z79GMqCox0WJFLSAmNsEIYhMMIDbBAGITDCA2wQBOZIKivCEi/xKRT0XkTrtE9Rty3DxBRGxgDngdWAY+At5S1Zn2yesPTtITvgJ8qqoLqloBfg282R5Z/YVzgs/mgX83HS8DXz3qAyLS7+n5pqqe2994EhNaQkTeBd497fN0CUshNZ7EhP8Ahabjz9fbXkBV7wJ3Ie4Jh3GSM eEjYEpEvigiSeDbwAftkdVfHLSnqKovIt8DfgfYwHuq+knblPURxw5Rj3Wy+HL0QFvf298YZ8wGEJtgALEJBhC bYACnnqyZgIggIlhW7TsXBAEmra33rAnhPz6TyTAyMsLw8DBXr14lmUxy//595ubmopbYoKdNsG2bwcFB8vk8 hUKBW7dukclWfHhYiE3oBLZtk0gkKBQK3Lhxg3PnzjE6OoplWaTTaVzXxfd9fN+PWmrvmpBIJBgYGODy5cv cvn2bdDrN3t4exWKR4eFhcrkce3t7707uRi21d6OjCExwHI00k06nSaVSpFMJhubbdtRywR6uCfsx7Ztstksqsrw8 DBDQ0N4nkexWIXaWu/2hP2EvSKRSDReTekJfWOCyfSdCSISstYSXEkUJivKeiKyLyD+b2kZE5PciMl9//dzpym wfqopt2ziOg2VZRpjSSk/4BfDGvrY7wleqOgV8WD82muZpimYTTOCVKIT1T8DWvuY3gffr++8D32qzrlNBVR ERBgYGyOVyuK4btSTg+CHqmKqu1vfXgLE26Tl1LMvi7NmzTE5OUiwWEZHIJ/NOnCeoqh61bBlVyYuqvrSF CVwqlSKdTpNIJDot60COe1F8LCLjAPXX9cP+UFXvquprB62tniaqSrVapVKpUCqVKJfLDSNyuRyjo6Nks9lOSj qU45rwAfB2ff9t4LftkdM+QhNUIUqlgu/7DROSySQDAwM4jhkTBq2EqL8C/gJ8SUSWReQd4MfA6yIyD3yzfmw UnudRLpfZ2tpiaWmJIZUVKpVK1LIO5JVfBVV965C3vtFmLW0lCAKCIGBnZ4eVIRVUIYmJCVKpVNTSxSk MQLnPiu0wgL40wbIsbNvunoy51xARXNclK8mQSqW6Zu6o50gmK7iua8x6ghmBcgexbZtCoUA2m+XBgwdG9IS +MSGcH7Isi5GREbLZLENDQxGrqtHzJuzu7rK8vAzUEjgT6QsTFhcXERFjM+aeH5h9329M4AVBAPyvHCasTU omk5Fq7HkTPM9ja2uLYrFItVoFauNCWl135swZerclpJFSz5tQrVYb80jh4BxWaFuWheM4kYeqPW+CqhIEQWN aOyQsGI5N6ADhukLYE5qNaO4JUeYLrawnFETkjyIyKfiMj36+1dufZSLBaZnZ1lbm6O1dVVNjc3qVQqOI7D +fPnuX79OpcuXYp0iruVnuADP1TVaeBrwHdFZJouKXsJQ9TFxUU2NjbY3t4mCAIcx2F8fJxr165x8eLFSNebWy l5WVXVh/X9p8AstZuLdFXZi+d5bGxssLa2xrNnz/A8j5WVFR4+fMj8/HykOcT/layJyCRwDfgrXVb2Ui6XWVhY aFRlZzIZZmZmuHfvHqVSiVKpFJm2lk0QkQzwG+AHqrrTPJAdVfZi0l1egiDA9/1GvuB5HqVSiUqIEmntUUvRk YgkqBnwS1W9V29uqewlqpKXVxGGrr7vNzLpqGglOhLg58Csqv6s6S3jy16OotvyhOvAd4AbIvJxftbJF5S9HERY d+S6LhMTE1y5coULFy5EGh21UvLyZ+CwTMBospf9hONY+MvOoaEh8vk8lmXx6NGjyKa6ez5jDkmlUkxOTjI1 NcXg4CBBELC3t8fm5iY7OzuRjgs9v54Q4rouU1NTTE9PMzg4iO/7707usrGx8cIMaxT0jQnVapWnT59SLBZRV
```

VzX5fnz5y+ErFHRNyaUy2WWlpawLIuxsTGy2Szb29t4ntcoFo6KvjHB8zweP35MKpXC8zwymQxPnjzB87zI84S  
+uQee67rk8/nGcqbjOKyvr7O2tkYQBJ2KjA68B17fmGAI8Y0ITSU2wQBiEwwgNsEAYhMMoNN5wibwrP7abZz  
l5Lq/cFBjR0NUABH5m2kLPK1wmrrjy5EBxCYyQBQm3I3gnO3g1HR3fEyIeZn4cmQAHTOhW55OGEnt7UH3  
BWr3Ru2ZO58BF4Ak8HdguhPnPobWceDL9f0stacqTgM/Be7U2+8AP2nXOTvVE7rm6YRR1N52yoSDnk6Y79C  
5j02nam/jgfkQ9tfeNr+ntWtS28LKTpnQ0tMJTeEktbfHoVMmdM3TCSOpvelg1HGTWqTxGfCjqKOgl3R+ndql5h  
/Ax/XtJnCG2i+S5oE/ACPtOmecMRtAPDAbQGyCAcQmGEBsggHEJhhAbIIBxCYyQGyCAfwXLEbvSiGTFak  
AAAAASUVORK5CYII=\n"

```
    },  
    "metadata": {  
      "needs_background": "light"  
    }  
  }  
]  
}  
]  
}
```