逆向第二周wp

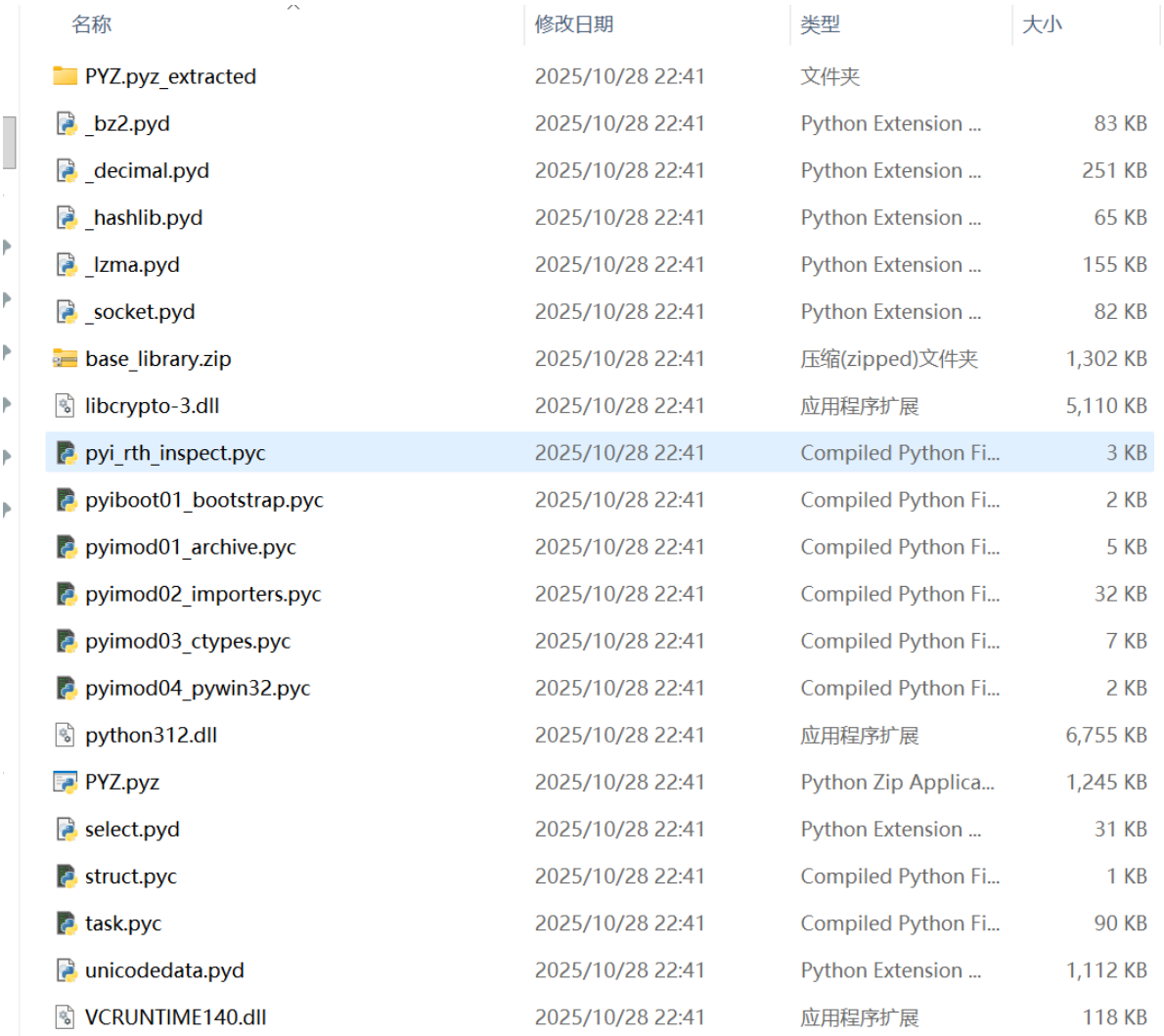
逆向题目wp

张程思

一,pyz3

1,根据题目名称可知这是一道关于py的逆向题目,之前在ctfbase做过几乎一模一样的

2,先按这个流程解包 PyInstaller 的文件;



名称	修改日期	类型	大小
PYZ.pyz_extracted	2025/10/28 22:41	文件夹	
_bz2.pyd	2025/10/28 22:41	Python Extension ...	83 KB
_decimal.pyd	2025/10/28 22:41	Python Extension ...	251 KB
_hashlib.pyd	2025/10/28 22:41	Python Extension ...	65 KB
_lzma.pyd	2025/10/28 22:41	Python Extension ...	155 KB
_socket.pyd	2025/10/28 22:41	Python Extension ...	82 KB
base_library.zip	2025/10/28 22:41	压缩(zipped)文件夹	1,302 KB
libcrypto-3.dll	2025/10/28 22:41	应用程序扩展	5,110 KB
pyi_rth_inspect.pyc	2025/10/28 22:41	Compiled Python Fi...	3 KB
pyiboot01_bootstrap.pyc	2025/10/28 22:41	Compiled Python Fi...	2 KB
pyimod01_archive.pyc	2025/10/28 22:41	Compiled Python Fi...	5 KB
pyimod02_importers.pyc	2025/10/28 22:41	Compiled Python Fi...	32 KB
pyimod03_ctypes.pyc	2025/10/28 22:41	Compiled Python Fi...	7 KB
pyimod04_pywin32.pyc	2025/10/28 22:41	Compiled Python Fi...	2 KB
python312.dll	2025/10/28 22:41	应用程序扩展	6,755 KB
PYZ.pyz	2025/10/28 22:41	Python Zip Applica...	1,245 KB
select.pyd	2025/10/28 22:41	Python Extension ...	31 KB
struct.pyc	2025/10/28 22:41	Compiled Python Fi...	1 KB
task.pyc	2025/10/28 22:41	Compiled Python Fi...	90 KB
unicodedata.pyd	2025/10/28 22:41	Python Extension ...	1,112 KB
VCRUNTIME140.dll	2025/10/28 22:41	应用程序扩展	118 KB

3,使用pycdc反编译其中的task.pyc文件提取py代码

```
# Source Generated with Decompyle++
# File: task.pyc (Python 3.12)


def check(flag):
    if 47 * flag[0] + 41 * flag[1] + 32 * flag[2] + 56 * flag[3] + 52 * flag[4] + 67 * flag[5] + 13 * flag[6] + 25 * flag[7] + 20 * flag[8] + 98 * flag[9] + 88 * flag[10] + 65 * flag[11] + 82 * flag[12] + 92 * flag[13] + 3 * flag[14] + 29 * flag[15] + 93 * flag[16] + 88 * flag[17] + 45 * flag[18] + 58 * flag[19] + 40 * flag[20] + 72 * flag[21] + 99 * flag[22] + 10 * flag[23] + 94 * flag[24] + 62 * flag[25] + 82 * flag[26] + 92 * flag[27] + 23 * flag[28] + 46 * flag[29] + 55 * flag[30] + 72 * flag[31] + 44 * flag[32] + 9 * flag[33] + 65 * flag[34] + 42 * flag[35] == 176386 and 10 * flag[0] + 98 * flag[1] + 5 * flag[2] + 28 * flag[3] + 68 * flag[4] + 20 * flag[5] + 2 * flag[6] + 22 * flag[7] + 65 * flag[8] + 44 * flag[9] + 85 * flag[10] + 97 * flag[11] + 33 * flag[12] + 74 * flag[13] + 93 * flag[14] + 74 * flag[15] + 41 * flag[16] + 65 * flag[17] + 32 * flag[18] + 93 * flag[19] + 22 * flag[20] + 69 * flag[21] + 68 * flag[22] + 57 * flag[23] + 47 * flag[24] + 29 * flag[25] + 74 * flag[26] + 54 * flag[27] + 91 * flag[28] + 90 * flag[29] + 26 * flag[30] + 11 * flag[31] + 89 * flag[32] + 57 * flag[33] + 100 * flag[34] + 95 * flag[35] == 186050 and 25 * flag[0] + 22 * flag[1] + 54 * flag[2] + 5 * flag[3] + 8 * flag[4] + 3 * flag[5] + 12 * flag[6] + 70 * flag[7] + 25 * flag[8] + 61 * flag[9] + 68 * flag[10] + 12 * flag[11] + 27 * flag[12] + 42 * flag[13] + 83 * flag[14] + 91 * flag[15] + 67 * flag[16] + 46 * flag[17] + 8 * flag[18] + 45 * flag[19] + 94 * flag[20] + 80 * flag[21] + 69 * flag[22] + 95 * flag[23] + 12 * flag[24] + 21 * flag[25] + 94 * flag[26] + 82 * flag[27] + 93 * flag[28] + 41 * flag[29] + 4 * flag[30] + 56 * flag[31] + 92 * flag[32] + 77 * flag[33] + 15 * flag[34] + 30 * flag[35] == 154690 and 33 * flag[0] + 49 * flag[1] + 56 * flag[2] + 40 * flag[3] + 90 * flag[4] + 59 * flag[5] + 82 * flag[6] + 6 * flag[7] + 81 * flag[8] + 32 * flag[9] + 23 * flag[10] + 76 * flag[11] + 93 * flag[12] + 83 * flag[13] + 10 * flag[14] + 44 * flag[15] + 58 * flag[16] + 33 * flag[17] + 79 * flag[18] + 77 * flag[19] + 82 * flag[20] + 56 * flag[21] + 70 * flag[22] + 34 * flag[23] + 45 * flag[24] + 76 * flag[25] + 57 * flag[26] + 43 * flag[27] + 100 * flag[28] + 19 * flag[29] + 11 * flag[30] + 90 * flag[31] + 3 * flag[32] + 60 * flag[33] + 57 * flag[34] + 23 * flag[35] == 172116 and 65 * flag[0] + 70 * flag[1] + 20 * flag[2] + 32 * flag[3] + 75 * flag[4] + 30 * flag[5] + 3 * flag[6] + 78 * flag[7] + 35 * flag[8] + 45 * flag[9] + 95 * flag[10] + 93 * flag[11] + 52 * flag[12] + 32 * flag[13] + 88 * flag[14] + 94 * flag[15] + 67 * flag[16] + 34 * flag[17] + 91 * flag[18] + 88 * flag[19] + 31 * flag[20] + 61 * flag[21] + 17 * flag[22] + 99 * flag[23] + 100 * flag[24] + 49 * flag[25] + 4 * flag[26] + 60 * flag[27] + 81 * flag[28] + 88 * flag[29] + 43 * flag[30] + 34 * flag[31] + 30 * flag[32] + 52 * flag[33] + 18 * flag[34] + 100 * flag[35] == 190544 and 81 * flag[0] + 42 * flag[1] + 28 * flag[2] + 98 * flag[3] + 31 * flag[4] + 46 * flag[5] + 64 * flag[6] + 15 * flag[7] + 49 * flag[8] + 13 * flag[9] + 100 * flag[10] + 81 * flag[11] + 32 * flag[12] + 52 * flag[13] + 59 * flag[14] + 24 * flag[15] + 94 * flag[16] + 32 * flag[17] + 93 * flag[18] + 32 * flag[19] + 13 * flag[20] + 89 * flag[21] + 37 * flag[22] + 30 * flag[23] + 78 * flag[24] + 81 * flag[25] + 9 * flag[26] + 45 * flag[27] + 93 * flag[28] + 100 * flag[29] + 97 * flag[30] + 10 * flag[31] + 80 * flag[32] + 54 * flag[33] + 88 * flag[34] + 85 * flag[35] == 190323 and 76 * flag[0] + 54 * flag[1] + 5 * flag[2] + 14 * flag[3] + 62 * flag[4] + 44 * flag[5] + 24 * flag[6] + 29 * flag[7] + 85 * flag[8] + 87 * flag[9] + 19 * flag[10] + 3 * flag[11] + 65 * flag[12] + 24 * flag[13] + 92 * flag[14] + 37 * flag[15] + 57 * flag[16] + 20 * flag[17] + 45 * flag[18] + 5 * flag[19] + 13 * flag[20] + 91 * flag[21] + 92 * flag[22] + 75 * flag[23] + 36 * flag[24] + 79 * flag[25] + 12 * flag[26] + 22 * flag[27] + 75 * flag[28] + 82 * flag[29] + 28 * flag[30] + 82 * flag[31] + 24 * flag[32] + 53 * flag[33] + 56 * flag[34] + 92 * flag[35] == 162017 and 53 * flag[0] + 52 * flag[1] + 72 * flag[2] + 23 * flag[3] + 26 * flag[4] + 13 * flag[5] + 62 * flag[6] + 96 * flag[7] + 67 * flag[8] + 96 * flag[9] + 66 * flag[10] + 41 * flag[11] + 5 * flag[12] + 18 * flag[13] + 37 * flag[14] + 13 * flag[15] + 61 * flag[16] + 71 * flag[17] + 91 * flag[18] + 96 * flag[19] + 56 * flag[20] + 3 * flag[21] + 65 * flag[22] + 14 * flag[23] + 57 * flag[24] + 69 * flag[25] + 75 * flag[26] + 68 * flag[27] + 10 * flag[28] + 60 * flag[29] + 62 * flag[30] + 95 * flag[31] + 53 * flag[32] + 19 * flag[33] + 7 * flag[34] + 56 * flag[35] == 165118 and 26 * flag[0] + 7 * flag[1] + 49 * flag[2] + 14 * flag[3] + 36 * flag[4] + 87 * flag[5] + 21 * flag[6] + 35 * flag[7] + 15 * flag[8] + 91 * flag[9] + 15 * flag[10] + 100 *
```

4,分析后发现这段代码的原理是通过一个36x36的线性方程组来验证输入的Flag,根据题目提示需要下载Z3 约束求解器,于是解题脚本如下

```
import z3

# f 是一个列表，包含36个Z3的整型变量，代表flag的36个字节
f = [z3.Int(f'f_{i}') for i in range(36)]

# 创建一个求解器实例
s = z3.Solver()

# --- 从代码中提取的系数矩阵 A 和结果向量 b ---

# A 是 36x36 的系数矩阵
A = [
    [47, 41, 32, 56, 52, 67, 13, 25, 20, 98, 88, 65, 82, 92, 3, 29, 93, 88,
45, 58, 40, 72, 99, 10, 94, 62, 82, 92, 23, 46, 55, 72, 44, 9, 65, 42],
    [10, 98, 5, 28, 68, 20, 2, 22, 65, 44, 85, 97, 33, 74, 93, 74, 41, 65, 32,
93, 22, 69, 68, 57, 47, 29, 74, 54, 91, 90, 26, 11, 89, 57, 100, 95],
    [25, 22, 54, 5, 8, 3, 12, 70, 25, 61, 68, 12, 27, 42, 83, 91, 67, 46, 8,
45, 94, 80, 69, 95, 12, 21, 94, 82, 93, 41, 4, 56, 92, 77, 15, 30],
    [33, 49, 56, 40, 90, 59, 82, 6, 81, 32, 23, 76, 93, 83, 10, 44, 58, 33,
79, 77, 82, 56, 70, 34, 45, 76, 57, 43, 100, 19, 11, 90, 3, 60, 57, 23],
    [65, 70, 20, 32, 75, 30, 3, 78, 35, 45, 95, 93, 52, 32, 88, 94, 67, 34,
91, 88, 31, 61, 17, 99, 100, 49, 4, 60, 81, 88, 43, 34, 30, 52, 18, 100],
    [81, 42, 28, 98, 31, 46, 64, 15, 49, 13, 100, 81, 32, 52, 59, 24, 94, 32,
93, 32, 13, 89, 37, 30, 78, 81, 9, 45, 93, 100, 97, 10, 80, 54, 88, 85],
    [76, 54, 5, 14, 62, 44, 24, 29, 85, 87, 19, 3, 65, 24, 92, 37, 57, 20, 45,
5, 13, 91, 92, 75, 36, 79, 12, 22, 75, 82, 28, 82, 24, 53, 56, 92],
    [53, 52, 72, 23, 26, 13, 62, 96, 67, 96, 66, 41, 5, 18, 37, 13, 61, 71,
91, 96, 56, 3, 65, 14, 57, 69, 75, 68, 10, 60, 62, 95, 53, 19, 7, 56],
    [26, 7, 49, 14, 36, 87, 21, 35, 15, 91, 15, 100, 8, 32, 100, 35, 66, 3,
79, 96, 82, 95, 68, 13, 86, 51, 24, 76, 30, 60, 29, 70, 40, 90, 44, 3],
    [47, 19, 37, 93, 73, 30, 45, 47, 72, 85, 37, 68, 89, 34, 4, 50, 87, 33,
87, 43, 9, 61, 93, 49, 74, 49, 68, 29, 54, 54, 37, 79, 33, 65, 59, 15],
    [79, 73, 60, 62, 25, 16, 77, 81, 79, 31, 82, 84, 62, 36, 18, 20, 46, 57,
21, 40, 3, 50, 58, 80, 84, 71, 87, 3, 13, 77, 83, 39, 55, 34, 41, 63],
    [7, 50, 26, 79, 21, 42, 83, 94, 63, 83, 3, 68, 25, 91, 3, 5, 17, 61, 3,
40, 87, 11, 27, 74, 73, 21, 56, 46, 36, 24, 14, 63, 21, 71, 30, 53],
    [57, 51, 49, 15, 94, 34, 27, 5, 100, 68, 67, 81, 10, 5, 85, 70, 80, 20,
89, 30, 84, 35, 41, 87, 75, 67, 20, 33, 29, 6, 97, 25, 10, 18, 23, 30],
    [97, 93, 10, 44, 28, 22, 17, 41, 47, 62, 42, 47, 61, 32, 31, 52, 47, 92,
42, 37, 7, 40, 48, 40, 11, 96, 51, 42, 66, 8, 89, 64, 30, 11, 8, 83],
    [51, 94, 58, 76, 21, 10, 75, 4, 55, 37, 71, 97, 27, 93, 82, 94, 38, 69,
36, 58, 93, 18, 54, 59, 12, 12, 54, 83, 73, 83, 33, 12, 78, 38, 45, 57],
    [78, 29, 8, 47, 48, 88, 18, 88, 50, 58, 36, 88, 9, 74, 85, 5, 91, 58, 85,
46, 89, 76, 61, 6, 61, 78, 4, 48, 50, 69, 23, 70, 23, 15, 22, 68],
    [75, 2, 94, 97, 72, 62, 78, 42, 69, 11, 37, 3, 29, 15, 39, 33, 18, 33, 12,
64, 6, 18, 34, 15, 3, 100, 85, 32, 97, 93, 84, 73, 26, 31, 71, 97],
```

```
    [59, 26, 48, 86, 58, 70, 61, 100, 63, 74, 26, 38, 24, 45, 52, 32, 91, 89,
19, 59, 87, 5, 15, 68, 72, 67, 2, 65, 46, 10, 33, 79, 11, 16, 73, 53],
    [6, 66, 59, 76, 86, 20, 59, 34, 28, 48, 86, 5, 87, 13, 95, 87, 65, 35, 58,
10, 98, 100, 4, 78, 66, 57, 34, 86, 62, 36, 92, 28, 3, 24, 49, 28],
    [25, 48, 44, 16, 99, 100, 69, 26, 65, 32, 18, 65, 58, 72, 61, 56, 10, 78,
93, 98, 39, 43, 87, 12, 42, 100, 100, 47, 31, 51, 75, 10, 63, 48, 22, 87],
    [61, 13, 100, 59, 31, 9, 28, 7, 27, 63, 11, 57, 95, 79, 21, 30, 60, 81,
43, 32, 30, 34, 80, 53, 28, 39, 74, 21, 18, 92, 73, 60, 21, 69, 76, 84],
    [22, 62, 61, 20, 66, 2, 11, 82, 93, 13, 69, 37, 92, 80, 66, 47, 28, 14,
62, 56, 89, 29, 39, 38, 46, 10, 6, 82, 77, 78, 45, 50, 5, 73, 17, 65],
    [5, 84, 83, 77, 76, 60, 20, 48, 53, 14, 98, 50, 37, 15, 31, 69, 55, 37,
64, 35, 26, 20, 18, 67, 50, 57, 60, 71, 4, 35, 23, 52, 11, 15, 83, 51],
    [33, 47, 89, 52, 89, 55, 98, 28, 48, 90, 69, 29, 68, 24, 19, 18, 44, 27,
14, 64, 15, 31, 23, 2, 36, 45, 37, 71, 61, 92, 28, 64, 13, 66, 98, 3],
    [80, 88, 68, 66, 46, 75, 32, 19, 36, 83, 63, 86, 79, 30, 61, 50, 100, 52,
66, 30, 20, 97, 45, 46, 38, 21, 32, 79, 68, 43, 65, 47, 86, 30, 74, 18],
    [11, 58, 95, 67, 96, 74, 60, 11, 21, 14, 100, 60, 70, 92, 92, 39, 43, 52,
5, 22, 90, 70, 12, 52, 36, 21, 45, 59, 74, 46, 11, 60, 8, 52, 14, 77],
    [57, 37, 94, 43, 53, 55, 7, 83, 91, 61, 86, 6, 44, 87, 61, 92, 24, 74,
100, 22, 12, 68, 19, 88, 81, 83, 70, 39, 30, 82, 30, 35, 55, 18, 27, 80],
    [80, 14, 5, 89, 71, 82, 44, 8, 33, 26, 77, 49, 36, 90, 73, 71, 66, 4, 37,
78, 38, 18, 15, 79, 6, 74, 18, 85, 56, 53, 90, 75, 52, 2, 13, 54],
    [96, 29, 37, 70, 92, 80, 24, 36, 32, 29, 78, 45, 58, 55, 16, 92, 71, 82,
86, 23, 4, 58, 16, 18, 38, 53, 82, 76, 83, 73, 87, 36, 61, 85, 61, 69],
    [14, 71, 53, 46, 59, 53, 22, 69, 67, 43, 23, 14, 77, 95, 19, 83, 79, 41,
12, 53, 3, 4, 65, 92, 64, 52, 3, 59, 89, 75, 12, 46, 61, 53, 97, 43],
    [57, 99, 49, 100, 68, 99, 26, 65, 47, 65, 90, 68, 84, 4, 9, 43, 88, 33,
48, 88, 37, 31, 21, 94, 22, 93, 70, 14, 13, 28, 83, 12, 80, 58, 43, 97],
    [33, 94, 56, 48, 13, 44, 81, 42, 19, 96, 67, 79, 12, 67, 34, 72, 45, 48,
24, 71, 65, 13, 32, 97, 48, 42, 65, 95, 54, 9, 35, 57, 18, 20, 83, 76],
    [31, 38, 83, 45, 28, 97, 54, 11, 80, 45, 92, 13, 52, 94, 51, 30, 11, 61,
46, 10, 28, 72, 20, 95, 90, 39, 32, 95, 19, 3, 65, 71, 73, 80, 23, 71],
    [9, 81, 80, 37, 96, 72, 95, 93, 26, 98, 50, 79, 57, 13, 49, 96, 82, 84,
89, 40, 38, 66, 81, 81, 79, 77, 86, 68, 26, 37, 15, 56, 13, 17, 50, 37],
    [82, 57, 33, 32, 79, 25, 54, 27, 50, 14, 72, 31, 28, 66, 4, 6, 48, 34, 63,
51, 12, 21, 73, 66, 53, 38, 54, 59, 76, 63, 61, 30, 84, 80, 98, 46],
    [69, 15, 23, 8, 46, 55, 21, 91, 37, 9, 61, 20, 23, 96, 28, 67, 19, 50, 18,
71, 30, 14, 10, 24, 100, 15, 91, 15, 93, 24, 46, 61, 67, 60, 56, 81]
]

# b 是 36 个等式的结果
b = [
    176386, 186050, 154690, 172116, 190544, 190323, 162017, 165118,
    153332, 168472, 178706, 143852, 154052, 147899, 176754, 171970,
    166497, 173887, 173189, 174138, 157623, 154943, 156078, 156158,
    181770, 173577, 180922, 158596, 181072, 163777, 187620, 169266,
```

```
    162587, 198705, 160349, 148095
]

# 添加约束条件：
# 1. Flag的字符都是可打印的ASCII字符（范围 32 到 126）
for i in range(36):
    s.add(f[i] >= 32, f[i] <= 126)

# 2. 添加36个线性方程
for i in range(36):
    # z3.Sum 计算点积 (A[i][0]*f[0] + A[i][1]*f[1] + ...)
    equation = z3.Sum([A[i][j] * f[j] for j in range(36)]) == b[i]
    s.add(equation)

# 检查是否能找到解
if s.check() == z3.sat:
    # 获取解
    m = s.model()
    # 从模型中提取flag的每个字节（整数）
    res = [m[f[i]].as_long() for i in range(36)]
    # 将整数列表转换回字符串
    flag_str = "".join(map(chr, res))
    print(f"🎉 成功找到Flag：")
    print(flag_str)
else:
    print("❌ 未能找到解。")
```

5,得出flag

```
flag{PytH0n_R3v3rs1Ng_4nd_Z3_s0lV3r}
```

二,Dont-debug-me

1,ida查看伪代码,其中有提示,包括题目也是提示,需要我们进行调试代码,先分析一下代码逻辑,如下路径可看出得出flag的方法

IDA View-A | Pseudocode-A | Hex View-1

```
1  int __fastcall main(int argc, const char **argv, const char **envp)
2  {
3    char o000[26]; // [rsp+20h] [rbp-70h] BYREF
4    char o00[6]; // [rsp+3Ah] [rbp-56h] BYREF
5    char o0[44]; // [rsp+40h] [rbp-50h] BYREF
6    int a; // [rsp+6Ch] [rbp-24h] BYREF
7    char O[32]; // [rsp+70h] [rbp-20h] BYREF
8
9    _main(argc, argv, envp);
10   strcpy(O, "plz_dont_debugme");
11   if ( IsDebugged() )
12   {
13     puts("GoOoD boy !!!");
14     puts("typing 1 give you flag:");
15     a = 0;
16     scanf("%d", &a);
17     if ( a == 1 )
18     {
19       strcpy(o0, "BaseCTF{Th1s_1s_a_fak3_f1ag}");
20       puts(o0);
21       return -1;
22     }
23     else if ( IsDebuggerPresentFlag() )
24     {
25       strcpy(o00, "laodi");
26       puts(o00);
27       return -1;
28     }
29     else
30     {
31       ex1t(O);
32       return 0;
33     }
34   }
35   else
36   {
37     strcpy(o000, "What are you doing !!!");
38     puts(o000);
39     return -1;
40   }
41 }
```

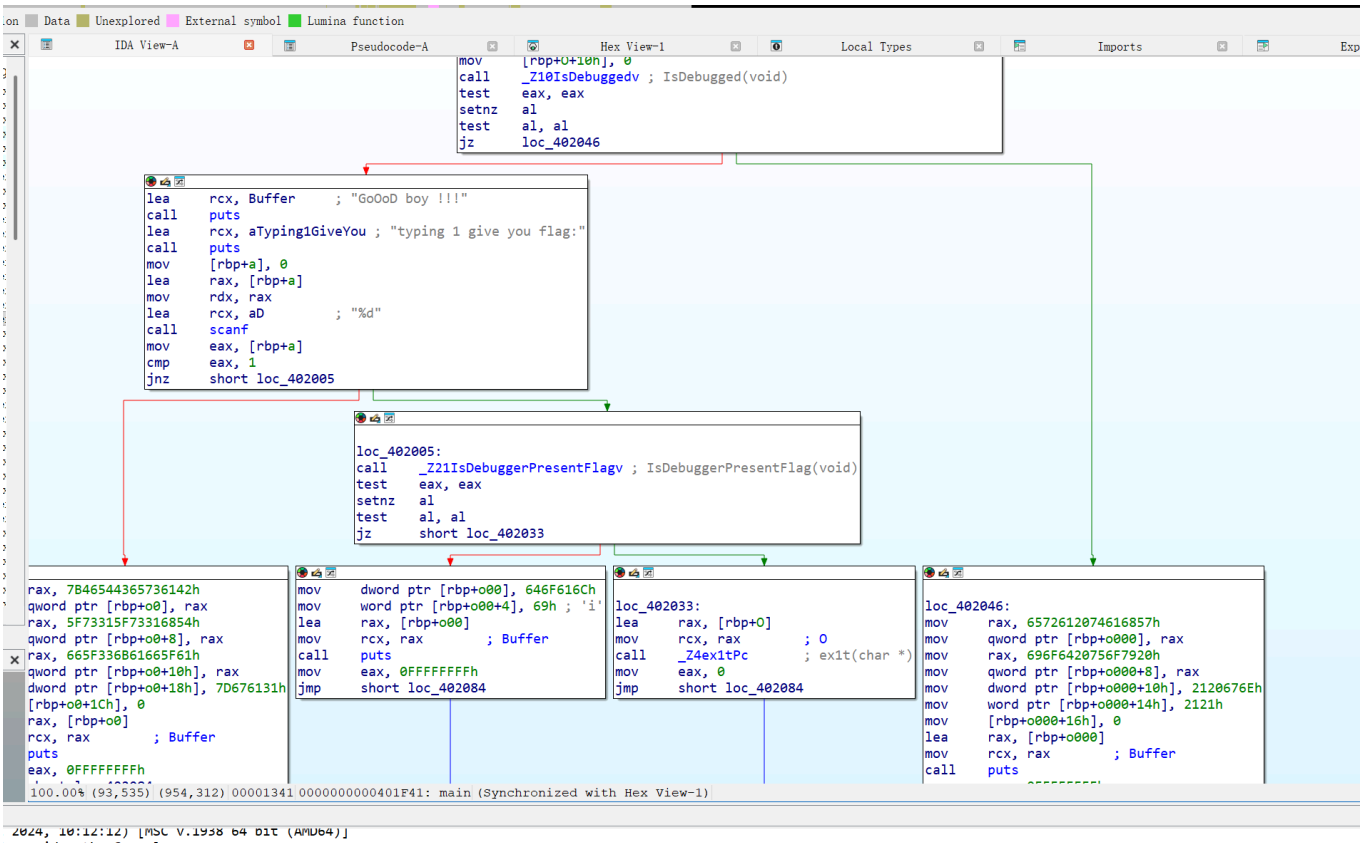
IDA View-A | Pseudocode-A

```
1  void __cdecl ex1t(char *O)
2  {
3    uint8_t mg[64]; // [rsp+20h] [rbp-70h] BYREF
4    uint8_t key[32]; // [rsp+60h] [rbp-30h] BYREF
5    uint64_t n; // [rsp+88h] [rbp-8h]
6
7    strcpy((char *)key, "plz_dont_debugme");
8    key[17] = 0;
9    *(_WORD *)&key[18] = 0;
10   *(_DWORD *)&key[20] = 0;
11   *(_QWORD *)&key[24] = 0;
12   n = 128;
13   strcpy((char *)mg, "BaseCTF{Y0u_r3a11y_kn0w_debugg!!!}");
14   memset(&mg[35], 0, 29);
15   s20(mg, 0x40u, key, 0x80u);
16   o0Oh(mg);
17 }
```

IDA View-A | Pse

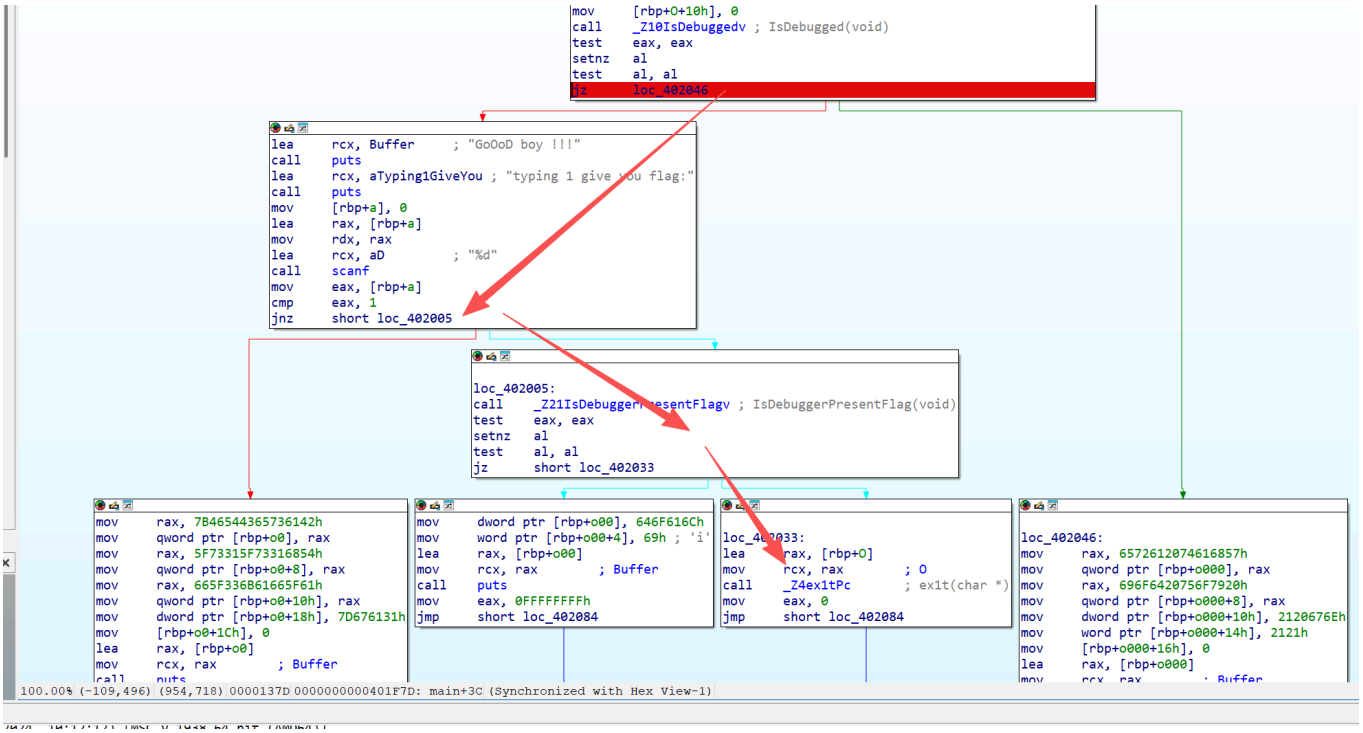
```
1  void __cdecl o0Oh(uint8_t *mg)
2  {
3    int i; // [rsp+2Ch] [rbp-4h]
4
5    printf("BaseCTF{");
6    for ( i = 0; i <= 31; ++i )
7      printf("%x", mg[i]);
8    putchar(125);
9    putchar(10);
10 }
```

2,知道了如何得到flag的途径后我们就分析一下asm页面,找到哪个分支是正确的绕过路径

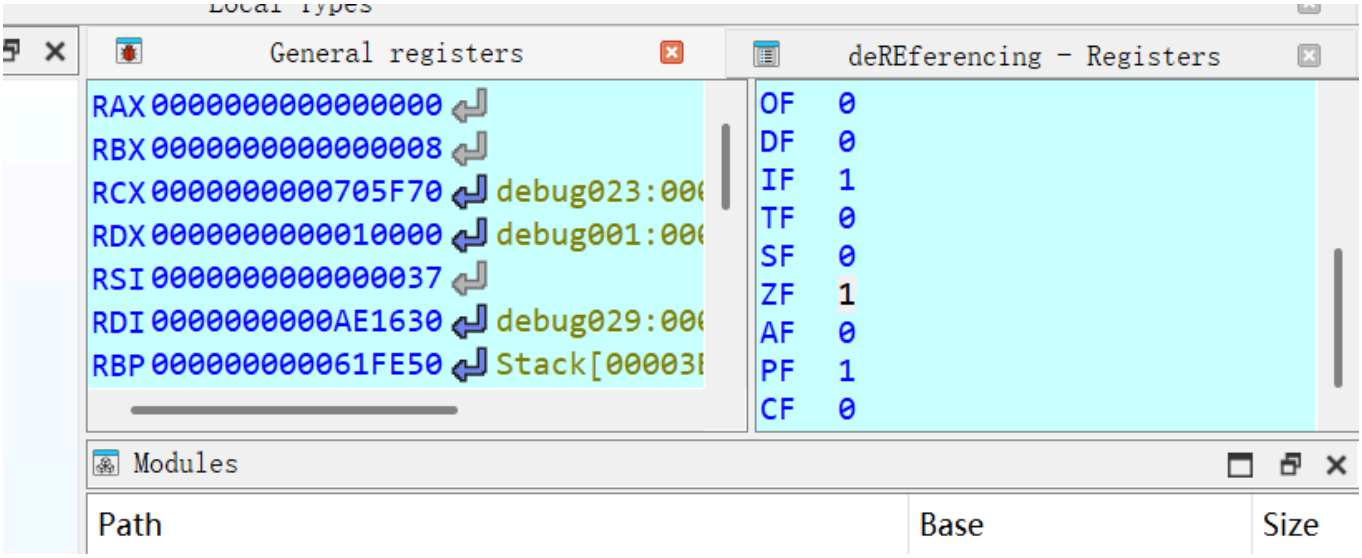


2024, 10:12:12) [MSC v.1938 64 bit (AMD64)]
eam <idapython@googlegroups.com>

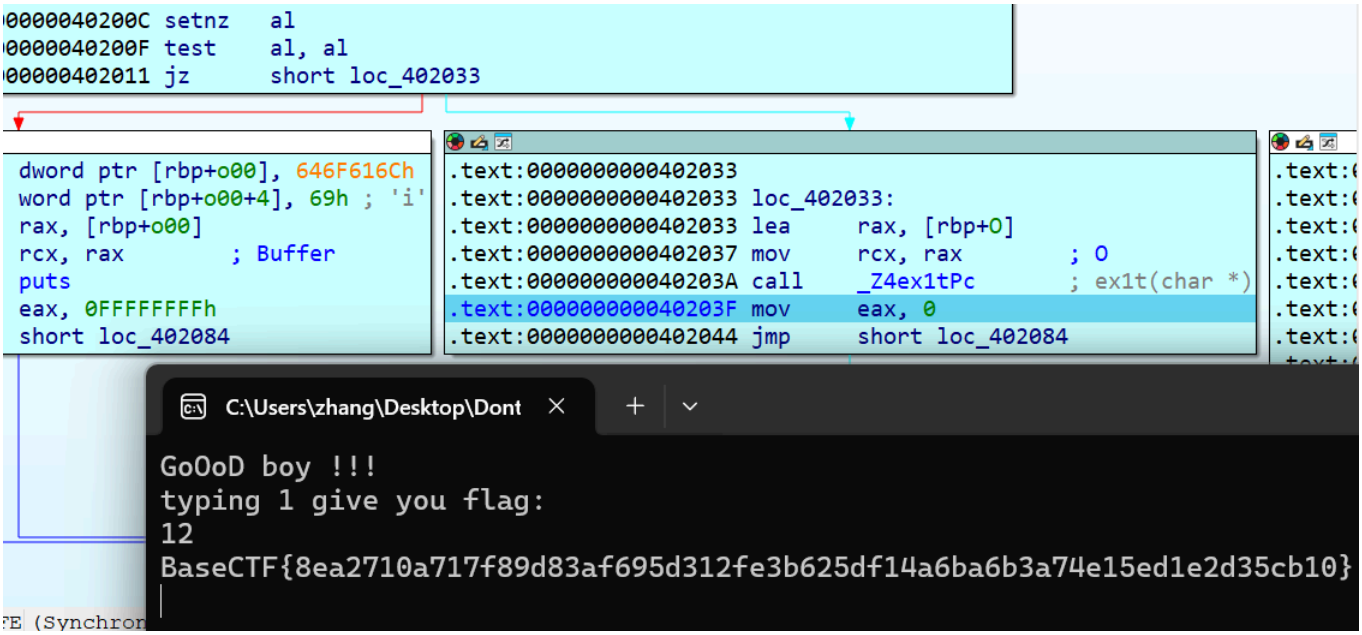
3,第一个判断语句在jz这一行,于是f2设置断点,并使用本地调试器进行调试,这里我自己调了好多次,最后得出的正确绕过路径是



4,调试后进入找到这个页面,由于jz 是 “Zero Flag is Set” 的缩写，意思是只有当 ZF=1时，才执行跳转,所以我们将1改为0,使其分支跳转到有scanf的这边,

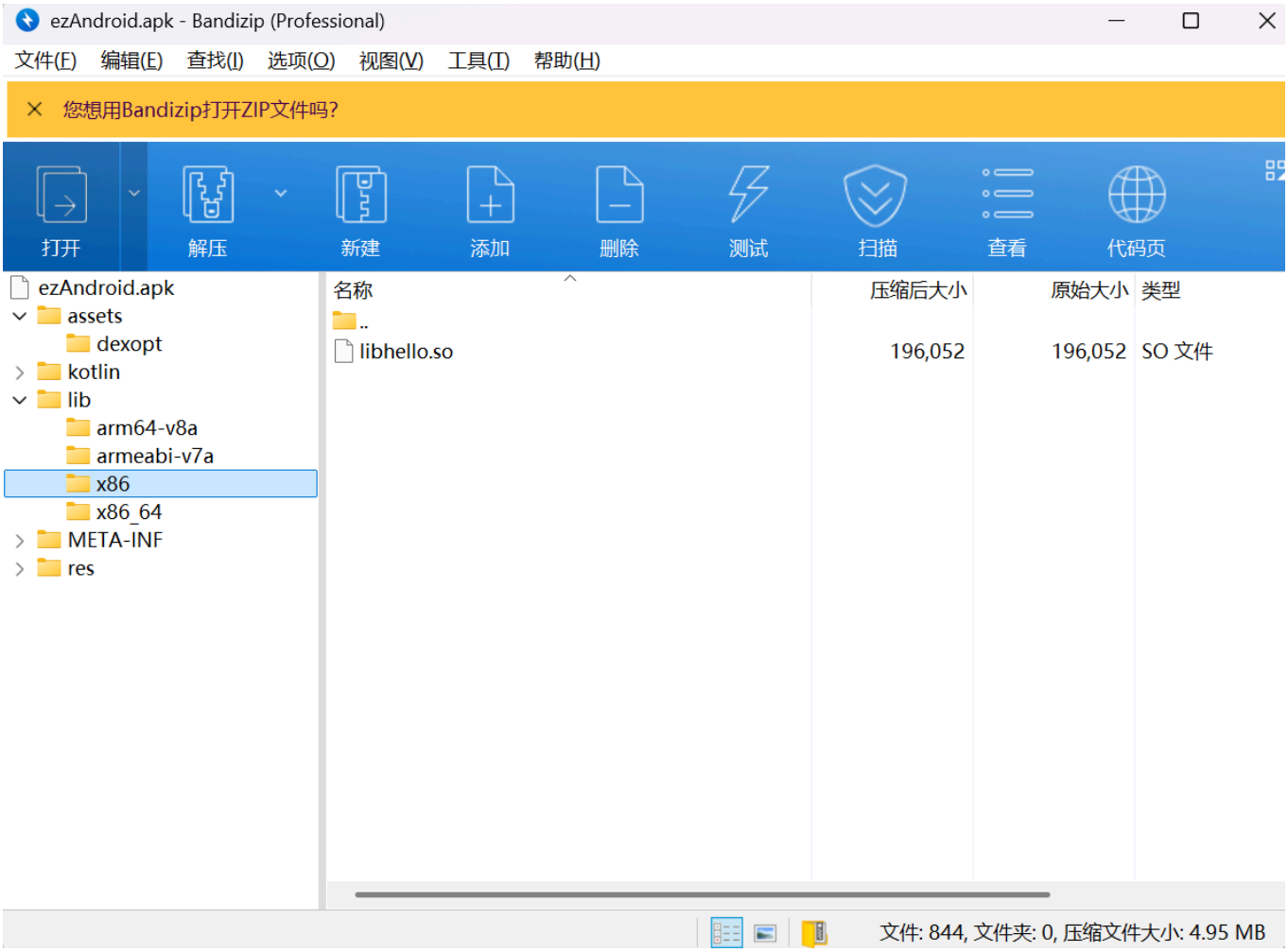


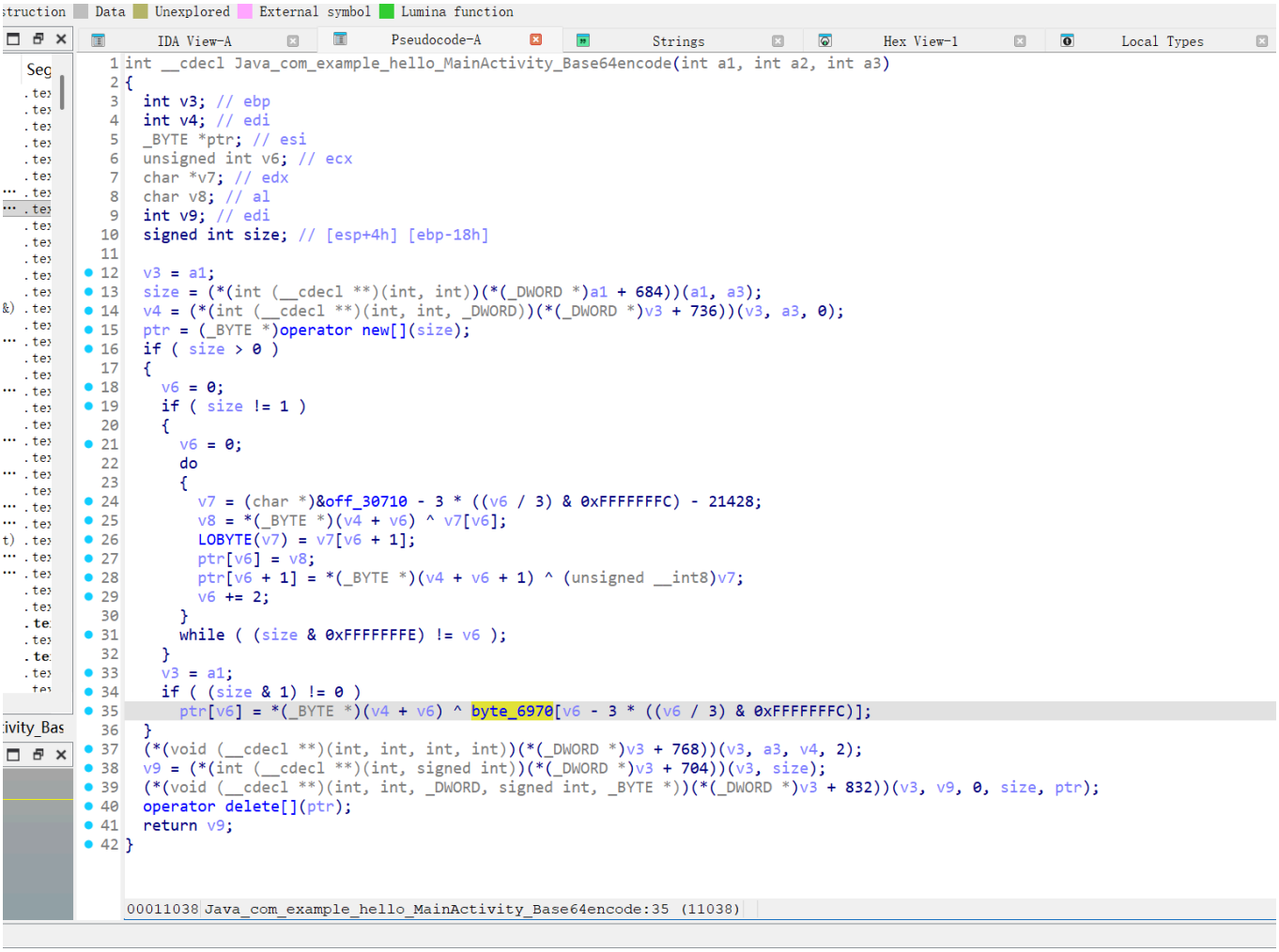
5,f8调试到这里就可以得出flag啦



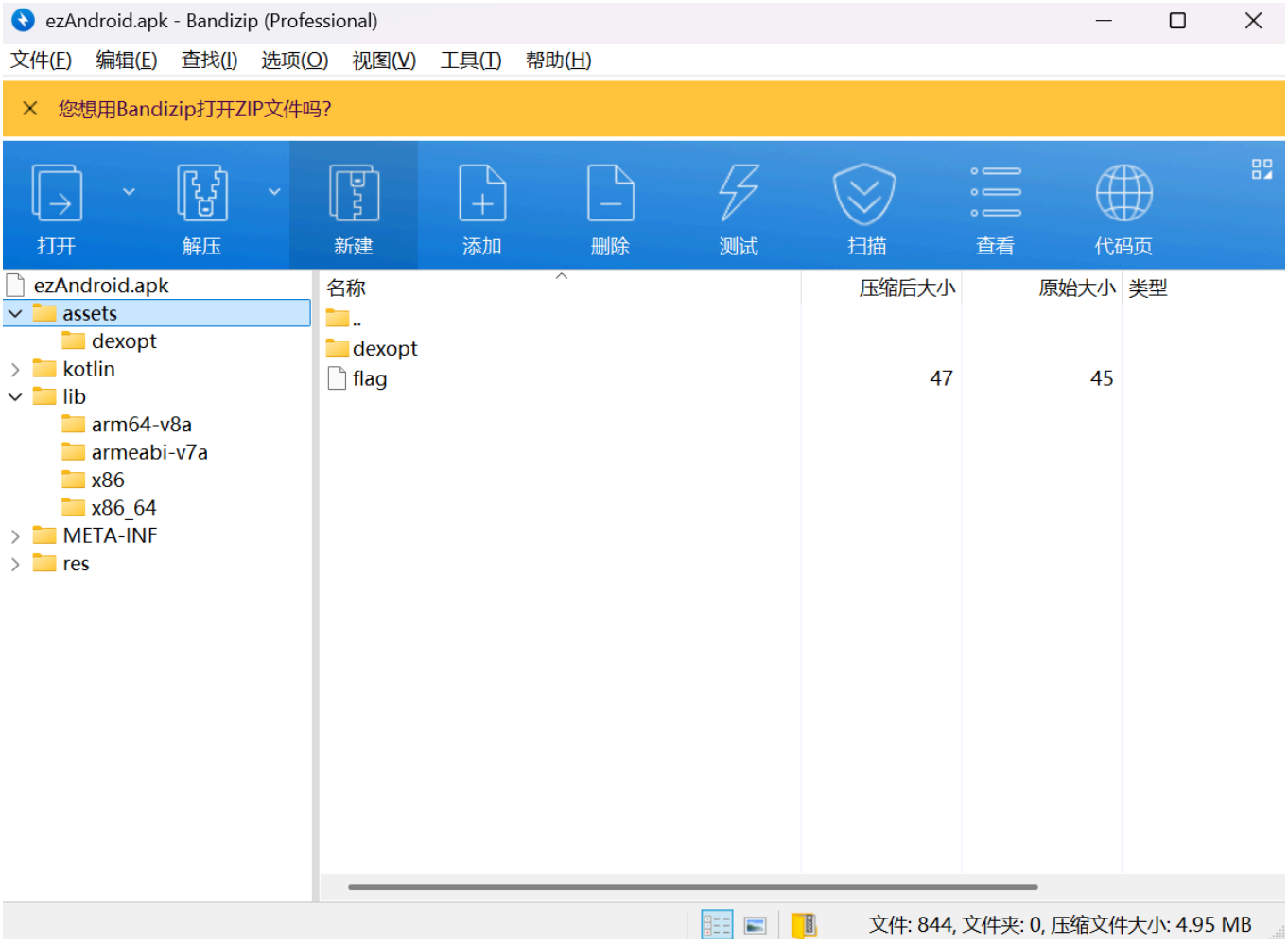
三, ezAndroid

1,apk附件可得是安卓逆向,放到jadx里看一下,查找mainactive函数,大概是base64然后又调用了一些函数,按照之前做安卓逆向的经验,我直接把apk里的so后缀文件单独解压出来放ida,发现就是简单的异或

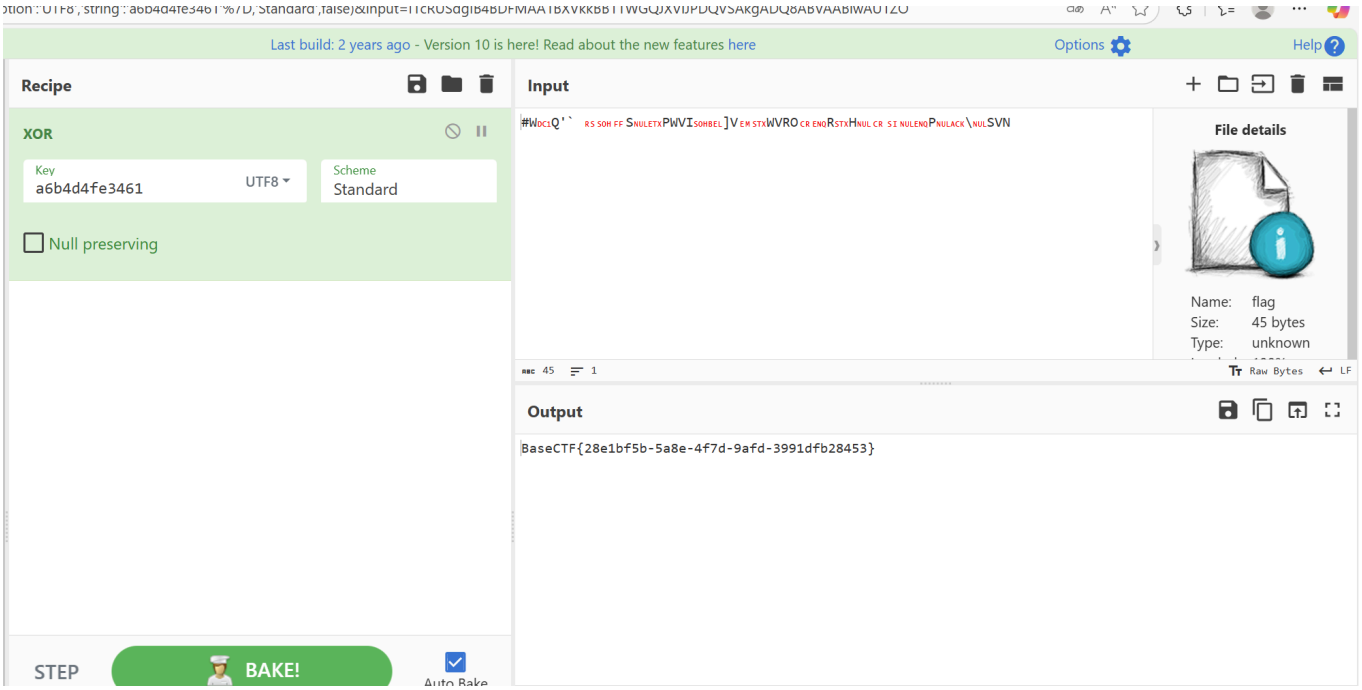

ezAndroid.apk - Bandizip (Professional)
文件(F) 编辑(E) 查找(I) 选项(O) 视图(V) 工具(T) 帮助(H)
您想用Bandizip打开ZIP文件吗?
打开
解压
新建
添加
删除
测试
扫描
查看
代码页
ezAndroid.apk
assets
dexopt
kotlin
lib
arm64-v8a
armeabi-v7a
x86
x86_64
META-INF
res
名称
压缩后大小
原始大小
类型
..
libhello.so
196,052
196,052
SO 文件
文件: 844, 文件夹: 0, 压缩文件大小: 4.95 MB



2,还缺少密文,ida中找不到,于是查看之前的apk文件,发现flag文件还在其中

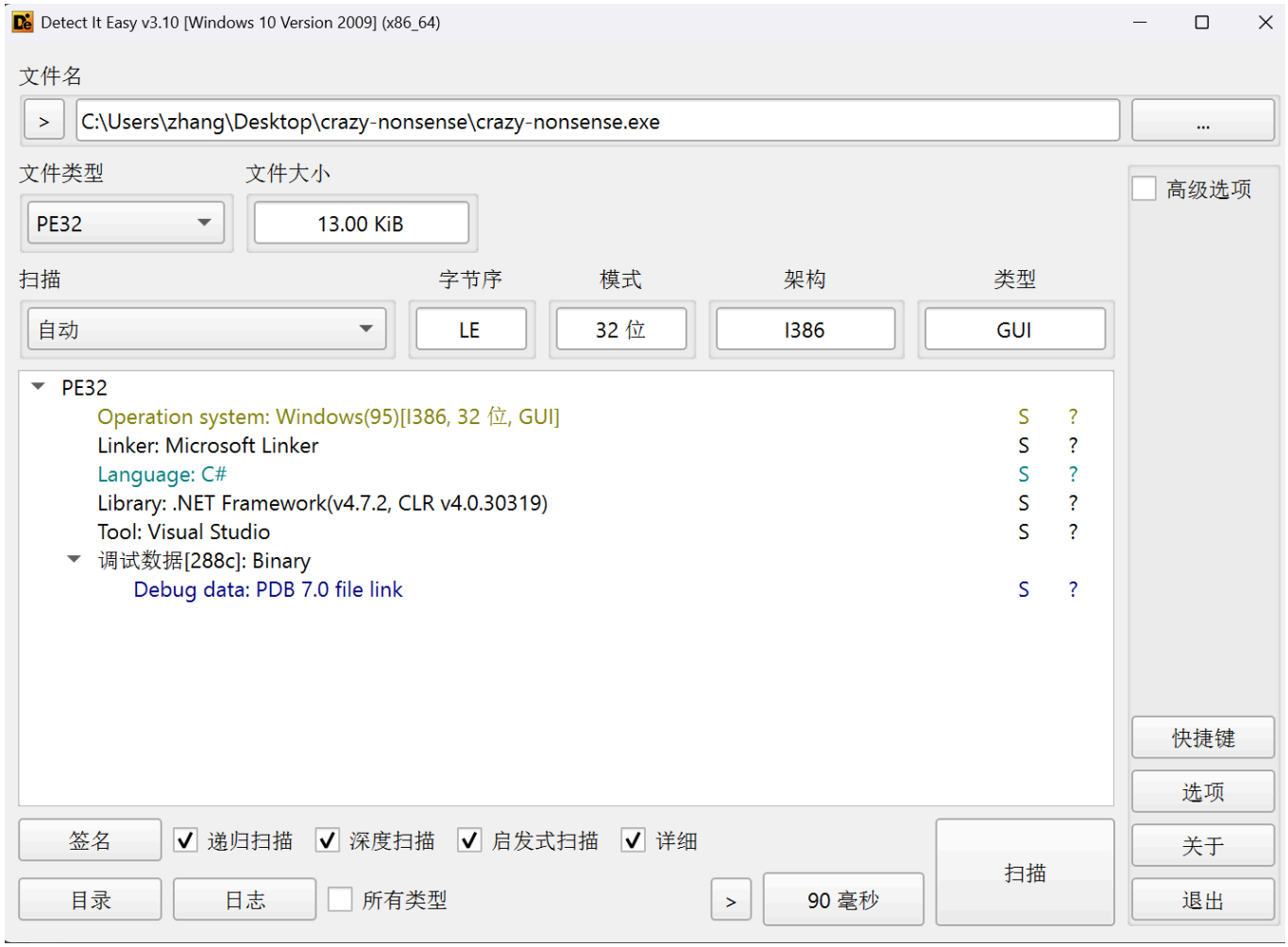


3,直接赛博厨子梭哈

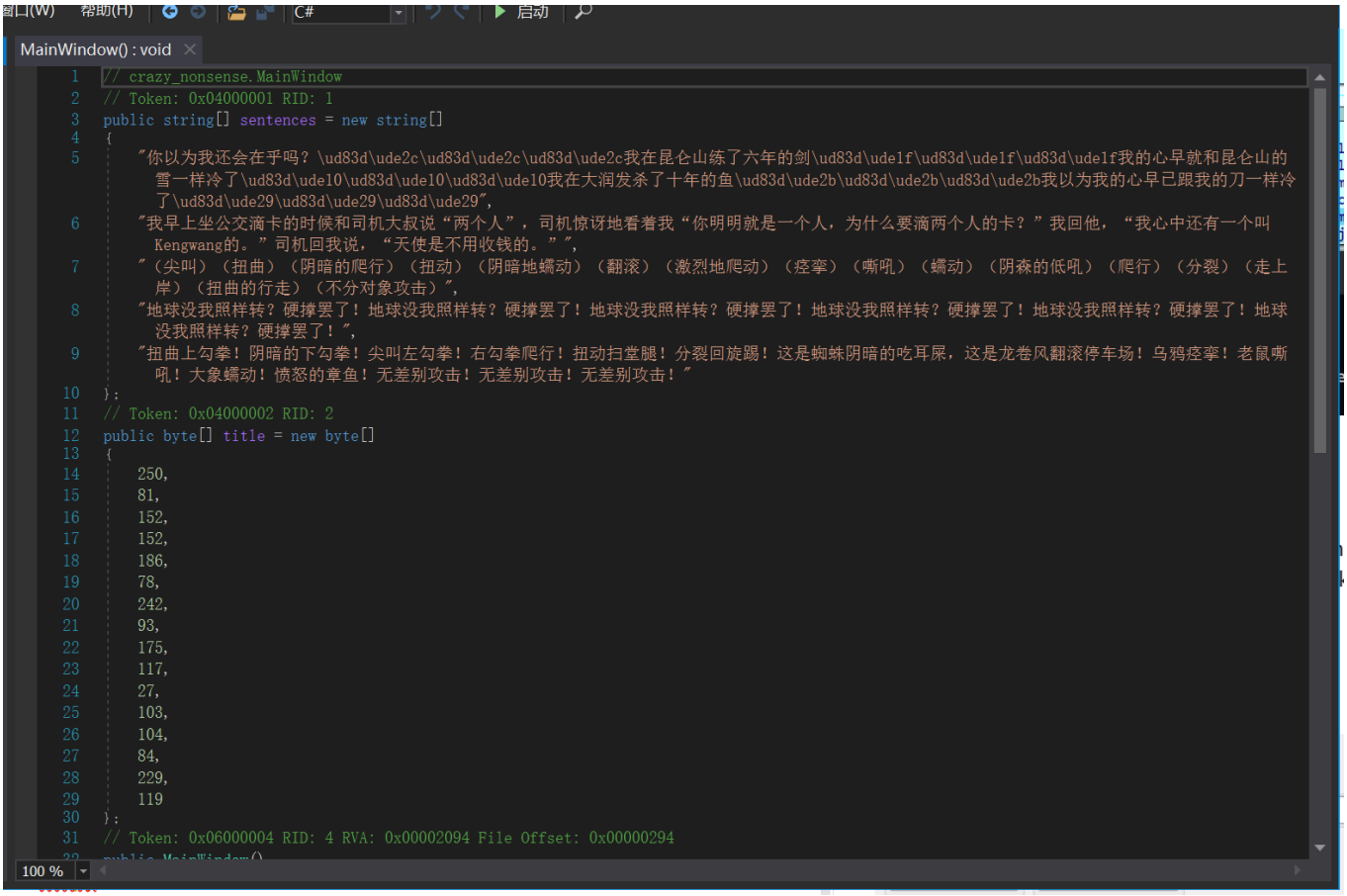


四,出题人已疯

1,放die里发现是net类型,需要用dnspy打开,



2,于是查看dnspy,找到main函数



3,脚本如下

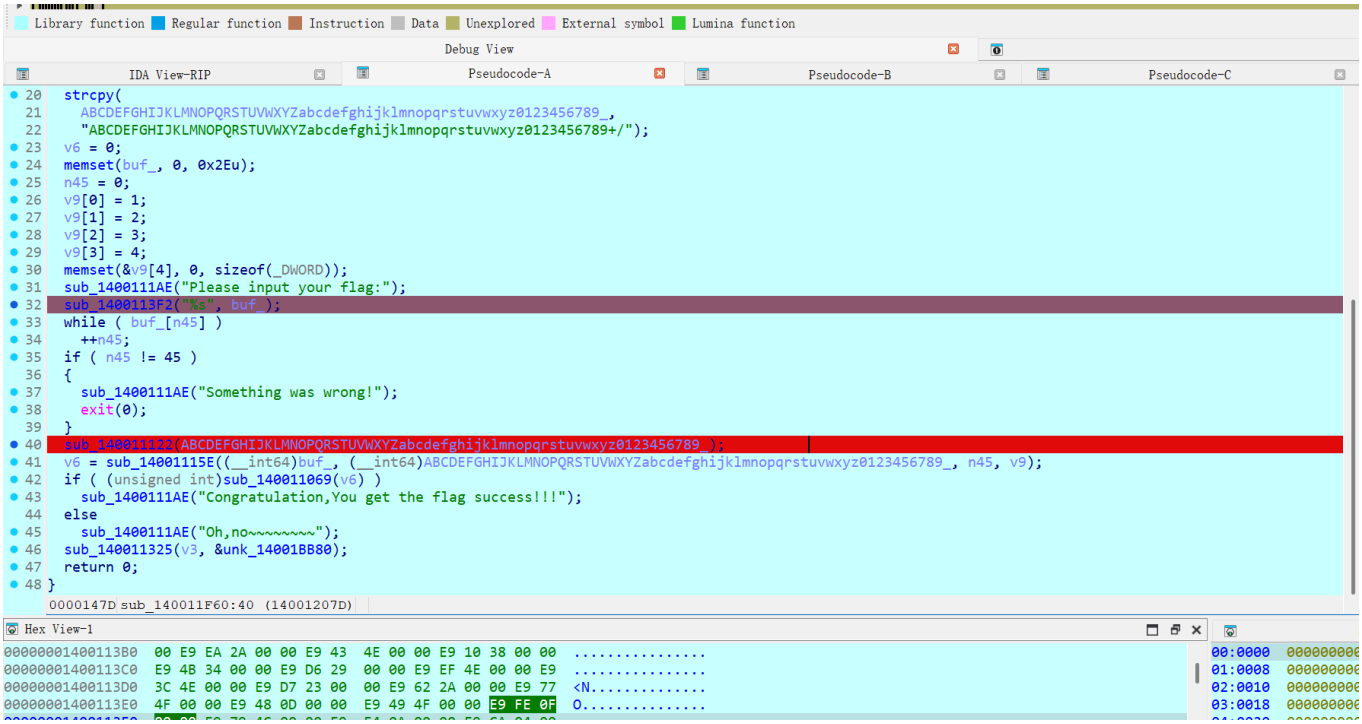
```
# -*- coding: utf-8 -*-
"""
Reverse-engineer the encoded title from crazy_nonsense.MainWindow
Recovered flag: BaseCTF{y0u_KnOw_UTF16_6uT_U_r_n0t_Cr@zym@n}
"""

import itertools

# ========== 1. 原始数据 ==========

# 题目给出的 byte[] title
title_bytes = [
    250, 81, 152, 152, 186, 78, 242, 93,
    175, 117, 27, 103, 104, 84, 229, 119
]

# 这些字符串在程序里参与了异或
sentences = [
    "你以为我还会在乎吗？😬😬😬我在昆仑山练了六年的剑😥😥😥我的心早就和昆仑山的雪一样冷了😬😬😬我在大润发杀了十年的鱼😫😫😫我以为我的心早已跟我的刀一样冷了😩😩😩",
    "我早上坐公交滴卡的时候和司机大叔说“两个人”，司机惊讶地看着我“你明明就是一个人，为什么要滴两个人的卡？”我回他，“我心中还有一个叫Kengwang的。”司机回我说，“天使是不用收钱的。”",
```

```
    "（尖叫）（扭曲）（阴暗的爬行）（扭动）（阴暗地蠕动）（翻滚）（激烈地爬动）（痉挛）（嘶吼）（蠕动）（阴森的低吼）（爬行）（分裂）（走上岸）（扭曲的行走）（不分对象攻击）",
    "地球没我照样转？硬撑罢了！" * 6,
    "扭曲上勾拳！阴暗的下勾拳！尖叫左勾拳！右勾拳爬行！扭动扫堂腿！分裂回旋踢！这是蜘蛛阴暗的吃耳屎，这是龙卷风翻滚停车场！乌鸦痉挛！老鼠嘶吼！大象蠕动！愤怒的章鱼！无差别攻击！无差别攻击！无差别攻击！"
]

# 拼接所有文本
source_text = "".join(sentences)
source_bytes = list(source_text.encode("utf-16-le"))  # Unicode 转 UTF-16 LE 字节序


# ========== 2. C# 加密逻辑模拟 ==========

def encrypt(input_text):
    """模拟原程序中的 Encoding.Unicode + mod + 异或 流程"""
    output = []
    for i, ch in enumerate(input_text):
        v = (ord(ch) * ord(ch)) % 0x10000
        # 与 source 的第 i 个字节异或（原始 C# 程序是 UTF-16 编码，因此 source_bytes[i]）
        v ^= source_bytes[i]
        output.append(v)
    return output


# ========== 3. 穷举反推解密 ==========

def decrypt(target):
    result_chars = []
    for i, val in enumerate(target):
        src = source_bytes[i]
        found = None
        # 只考虑常规可见 ASCII 范围
        for c in range(32, 127):
            if ((c * c) % 0x10000) ^ src == val:
                found = chr(c)
                break
        if found is None:
            raise ValueError(f"无法解出第 {i} 位")
        result_chars.append(found)
    return "".join(result_chars)
```

```
# ========== 4. 主流程 ==========

if __name__ == "__main__":
    flag = decrypt(title_bytes)
    print("Recovered flag:", flag)

    # 验证：重新加密后应与原数据一致
    assert encrypt(flag) == title_bytes
    print("Verification passed ✅")
```

五,ezbase

1,ida分析后发现找不到main函数,于是本地调试跑一下,找到了关键的逻辑



2,发现是base64,但码表应该被换了,于是分析换表的函数,

3,由此推出完整的魔改表

```
CDABGHEFKLIJOPMNSTQRWXUVabYZefcdijghmnklqropuvstyzwx23016745+/89
```

4,shift+f12找到目标编码字符串

```
TqK1YUSaQryEMHaLMnWhYU+Fe0WPenqhRXahfkV6WE2fa3iRW197Za62eEaD
```

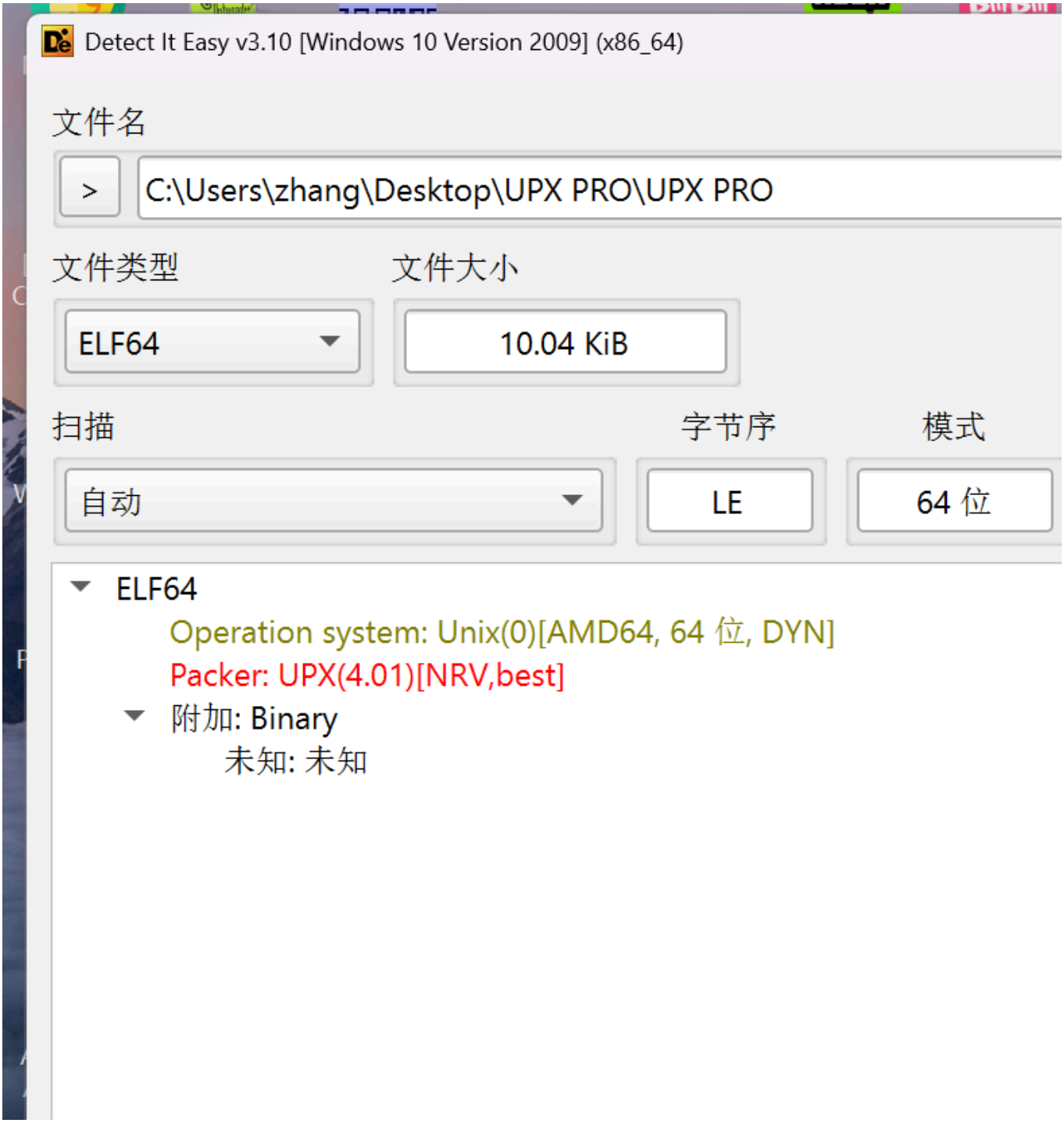
5,解题脚本如下

```
def decrypt(ciphertext, modified_table, key):
    # 构建魔改表的索引映射（字符→索引）
    table_index = {char: idx for idx, char in enumerate(modified_table)}
    cipher_len = len(ciphertext)
    plaintext = []

    # 按4个字符一组处理（对应3字节明文）
    for i in range(0, cipher_len, 4):
        # 取当前组的4个字符（确保不越界）
        group = ciphertext[i:i+4]
        if len(group) < 4:
            break  # 忽略不完整的组（通常不会出现）

        # 1. 查魔改表索引 → 2. 减去对应key偏移 → 3. 模64得到原始6位组索引
        indices = []
        for j in range(4):
            c = group[j]
            m = table_index[c]  # 魔改表中索引
            k = key[j % 4]      # 循环取key
            original_idx = (m - k) % 64  # 原始6位组索引
            indices.append(original_idx)
```

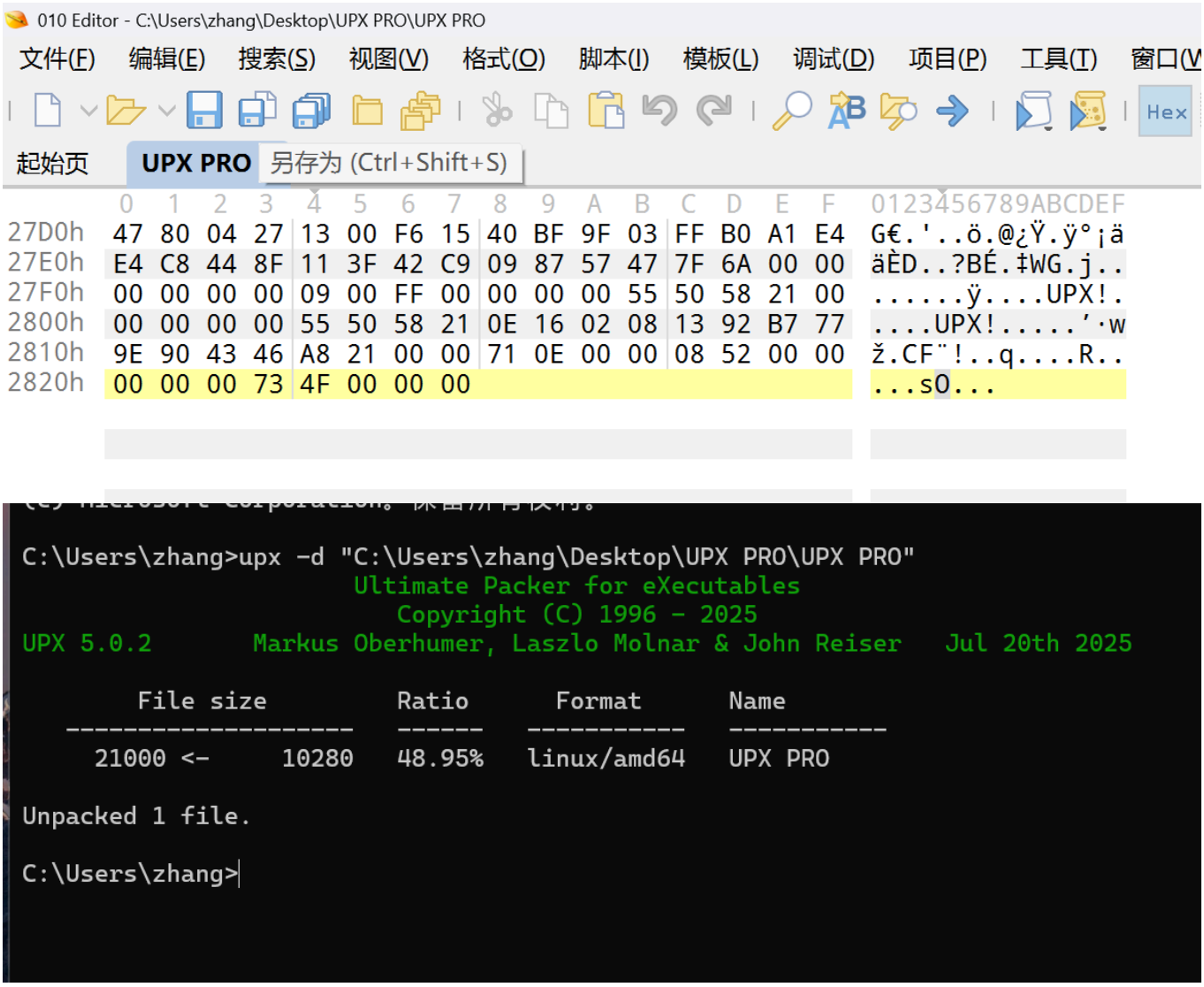
```
        # 4个6位组合并为24位整数（3字节）
        combined = (indices[0] << 18) | (indices[1] << 12) | (indices[2] << 6)
| indices[3]

        # 拆分24位为3个字节（8位/字节）
        byte1 = (combined >> 16) & 0xFF
        byte2 = (combined >> 8) & 0xFF
        byte3 = combined & 0xFF

        # 添加到明文（过滤空字节，通常不会有）
        plaintext.append(chr(byte1))
        plaintext.append(chr(byte2))
        plaintext.append(chr(byte3))

    # 拼接并截断到45字节（题目要求的flag长度）
    return ''.join(plaintext)[:45]

# 已知条件
modified_table =
"CDABGHEFKLIJOPMNSTQRWXUVabYZefcdijghmnklqropuvstyzwx23016745+/89"
key = [1, 2, 3, 4]
ciphertext = "TqK1YUSaQryEMHaLMnWhYU+Fe0WPenqhRXahfkV6WE2fa3iRW197Za62eEaD"

# 解密
flag = decrypt(ciphertext, modified_table, key)
print("解密结果：", flag)
```

六,UPX PRO

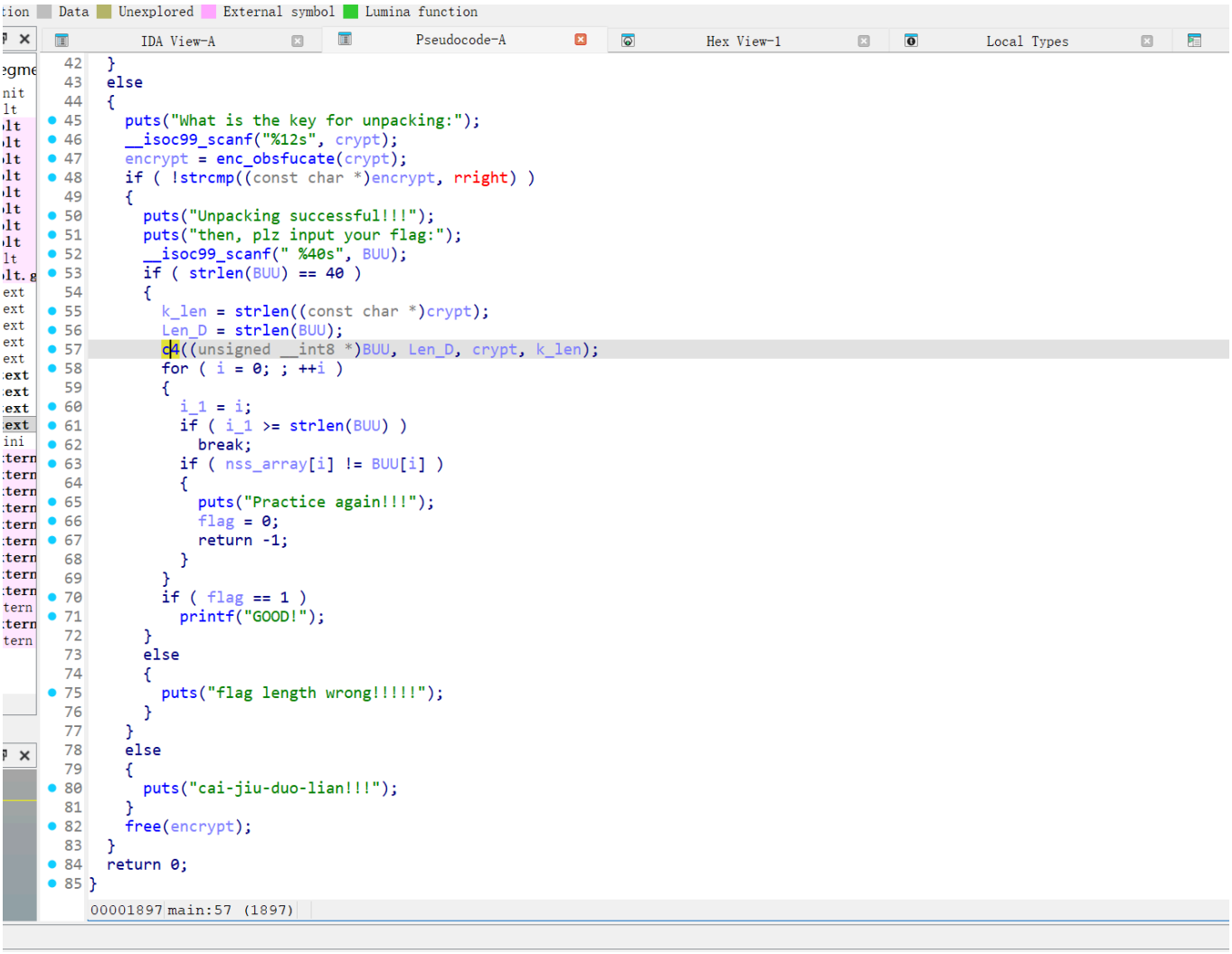
1,有壳,但尝试脱壳失败



2,放到101中看看关键的几处有没有被改,发现最后的标志位错了,将4F改为F4即可脱壳



3,ida先查看encode

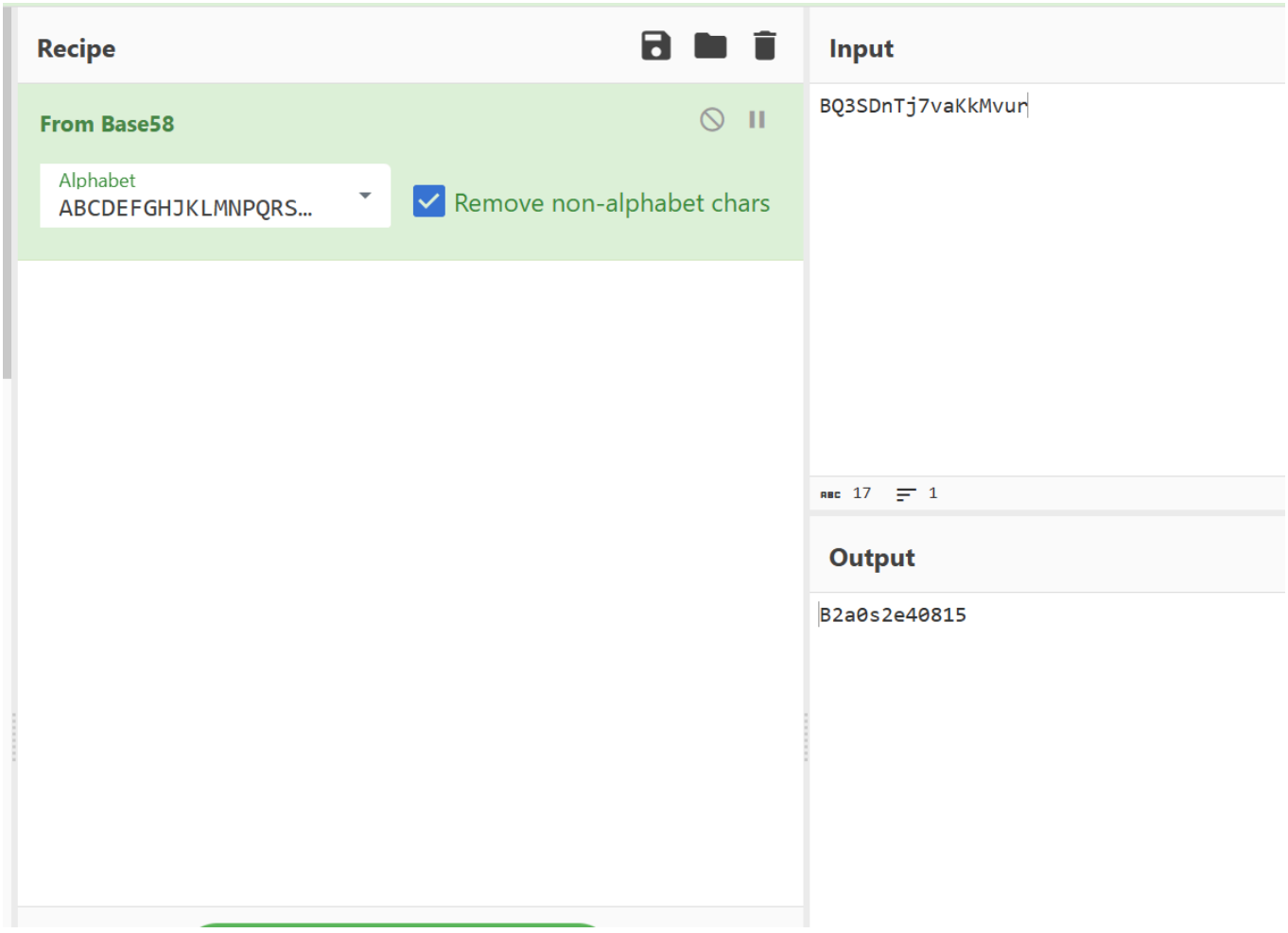

tion Data Unexplored External symbol Lumina function
IDA View-A
Pseudocode-A
Hex View-1
Local Types
42 }
43 else
44 {
45 puts("What is the key for unpacking:");
46 __isoc99_scanf("%12s", crypt);
47 encrypt = enc_obsfucate(crypt);
48 if (!strcmp((const char *)encrypt, rright))
49 {
50 puts("Unpacking successful!!!");
51 puts("then, plz input your flag:");
52 __isoc99_scanf(" %40s", BUU);
53 if (strlen(BUU) == 40)
54 {
55 k_len = strlen((const char *)crypt);
56 Len_D = strlen(BUU);
57 d4((unsigned __int8 *)BUU, Len_D, crypt, k_len);
58 for (i = 0; ; ++i)
59 {
60 i_1 = i;
61 if (i_1 >= strlen(BUU))
62 break;
63 if (nss_array[i] != BUU[i])
64 {
65 puts("Practice again!!!");
66 flag = 0;
67 return -1;
68 }
69 }
70 if (flag == 1)
71 printf("GOOD!");
72 }
73 else
74 {
75 puts("flag length wrong!!!!!");
76 }
77 }
78 else
79 {
80 puts("cai-jiu-duo-lian!!!");
81 }
82 free(encrypt);
83 }
84 return 0;
85 }
00001897 main:57 (1897)

IDA View-A | Pseudocode-A | Hex View-1 | Local Types | Imp

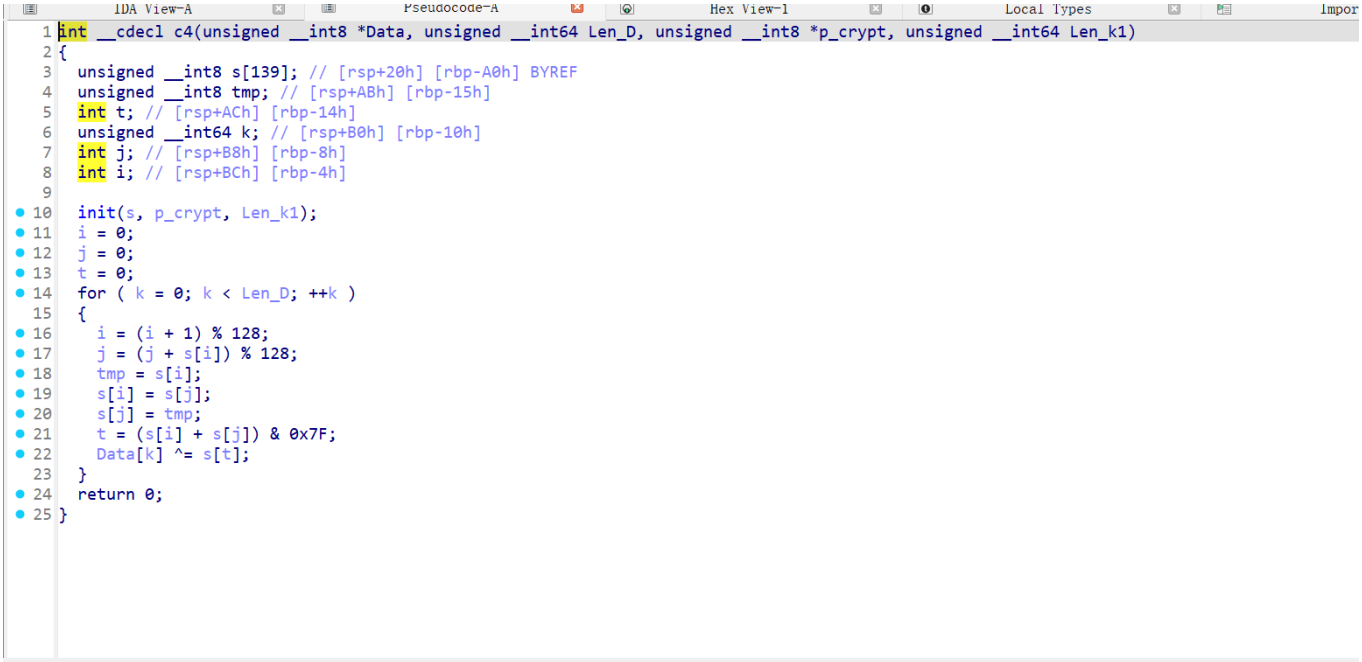
```
unsigned __int8 *__cdecl enc_obsfucate(unsigned __int8 *obf_input)
{
  unsigned int curr; // [rsp+14h] [rbp-4Ch]
  unsigned __int8 *end_ptr; // [rsp+18h] [rbp-48h]
  unsigned __int8 *obf_output; // [rsp+20h] [rbp-40h]
  size_t ret_len; // [rsp+28h] [rbp-38h]
  size_t obf_len; // [rsp+30h] [rbp-30h]
  unsigned __int8 rem; // [rsp+3Fh] [rbp-21h]
  size_t i; // [rsp+40h] [rbp-20h]
  unsigned __int8 *tmp_ptr; // [rsp+48h] [rbp-18h]
  unsigned __int8 *ret_ptr; // [rsp+50h] [rbp-10h]
  unsigned __int8 *interm; // [rsp+58h] [rbp-8h]

  obf_len = strlen((const char *)obf_input);
  ret_len = 3 * ((obf_len >> 1) + 1);
  obf_output = (unsigned __int8 *)malloc(ret_len + obf_len);
  ret_ptr = &obf_output[ret_len];
  end_ptr = &obf_output[ret_len - 1 + obf_len];
  interm = &obf_output[ret_len];
  memcpy(&obf_output[ret_len], obf_input, obf_len);
  while ( end_ptr >= interm )
  {
    if ( *interm )
    {
      rem = 0;
      for ( tmp_ptr = interm; end_ptr >= tmp_ptr; ++tmp_ptr )
      {
        curr = rem << 8;
        rem = *tmp_ptr - 58 * ((*tmp_ptr + curr) / 0x3A);
        *tmp_ptr = (*tmp_ptr + curr) / 0x3A;
      }
      *--ret_ptr = map58_0[rem];               // "ABCDEFGHJKLMNPQRSTUVWXYZ123456789abcdefghijkmnopqrstuvwxyz"
    }
    else
    {
      ++interm;
    }
  }
  for ( i = 0; i < &obf_output[ret_len] - ret_ptr; ++i )
    obf_output[i] = ret_ptr[i];
  obf_output[i] = 0;
  return obf_output;
}
```

000011B9 enc_obsfucate:1 (11B9)

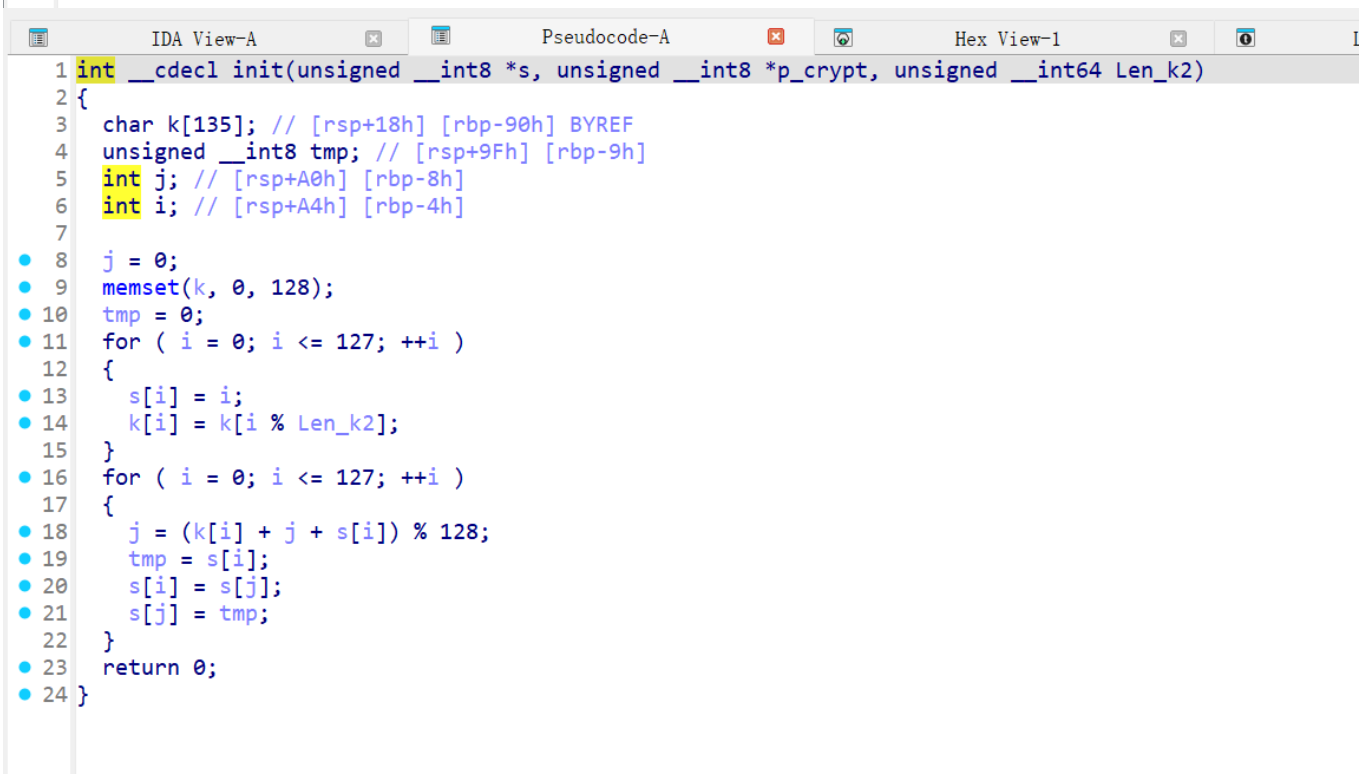
4,梭哈出来密钥



5,查看c4函数,发现就是改轮数的rc4加密



```
int __cdecl c4(unsigned __int8 *Data, unsigned __int64 Len_D, unsigned __int8 *p_crypt, unsigned __int64 Len_k1)
{
  unsigned __int8 s[139]; // [rsp+20h] [rbp-A0h] BYREF
  unsigned __int8 tmp; // [rsp+ABh] [rbp-15h]
  int t; // [rsp+ACh] [rbp-14h]
  unsigned __int64 k; // [rsp+B0h] [rbp-10h]
  int j; // [rsp+B8h] [rbp-8h]
  int i; // [rsp+BCh] [rbp-4h]

  init(s, p_crypt, Len_k1);
  i = 0;
  j = 0;
  t = 0;
  for ( k = 0; k < Len_D; ++k )
  {
    i = (i + 1) % 128;
    j = (j + s[i]) % 128;
    tmp = s[i];
    s[i] = s[j];
    s[j] = tmp;
    t = (s[i] + s[j]) & 0x7F;
    Data[k] ^= s[t];
  }
  return 0;
}
```



```
int __cdecl init(unsigned __int8 *s, unsigned __int8 *p_crypt, unsigned __int64 Len_k2)
{
  char k[135]; // [rsp+18h] [rbp-90h] BYREF
  unsigned __int8 tmp; // [rsp+9Fh] [rbp-9h]
  int j; // [rsp+A0h] [rbp-8h]
  int i; // [rsp+A4h] [rbp-4h]

  j = 0;
  memset(k, 0, 128);
  tmp = 0;
  for ( i = 0; i <= 127; ++i )
  {
    s[i] = i;
    k[i] = k[i % Len_k2];
  }
  for ( i = 0; i <= 127; ++i )
  {
    j = (k[i] + j + s[i]) % 128;
    tmp = s[i];
    s[i] = s[j];
    s[j] = tmp;
  }
  return 0;
}
```

6,解题脚本如下

```
#!/usr/bin/env python3
# coding: utf-8
# solve_flag.py
# 根据题目中的伪代码还原出 BUU（flag）
# 注意：init 函数中 k[i] = k[i % Len_k2] 的实现有 bug（k 全为 0），脚本按原始伪代码行为实现。

def u64_to_le_bytes(x):
    # 把 64-bit 常量拆成 8 个小端字节（低位在前）
```

```
    return [(x >> (8*i)) & 0xFF for i in range(8)]

def build_nss_array():
    vals = [
        0x364A65466C271216,
        0x2447243568082139,
        0x29323C0F5A1A7D60,
        0x4D647C3C45531544,
        0x74152339130F7024
    ]
    b = []
    for v in vals:
        b.extend(u64_to_le_bytes(v))
    # 只需要前 40 bytes（5*8=40）
    return bytes(b[:40])

def init_s_with_bug(len_k2):
    # 按照题目 init 实现（包含 bug）：k 被 memset 为 0，之后 k[i] = k[i % Len_k2]
(仍为0)
    s = list(range(128))
    # k 初始化为 128 个 0（效果与原代码给出一致）
    k = [0] * 128
    j = 0
    for i in range(128):
        j = (k[i] + j + s[i]) % 128
        s[i], s[j] = s[j], s[i]
    return s

def rc4_prga_bytes(s, length):
    # 生成 length 个 keystream 字节，按照题目 PRGA (128 模)
    s = s[:]  # 拷贝
    i = 0
    j = 0
    out = []
    for k in range(length):
        i = (i + 1) % 128
        j = (j + s[i]) % 128
        s[i], s[j] = s[j], s[i]
        t = (s[i] + s[j]) & 0x7F
        out.append(s[t])
    return bytes(out)

def c4_xor(data_bytes, key_bytes_len):
    # 与题目 c4 对应：init 使用 p_crypt 和 Len_k2，但因 bug 实际上与 p_crypt 无关
    s = init_s_with_bug(key_bytes_len)
    ks = rc4_prga_bytes(s, len(data_bytes))
```

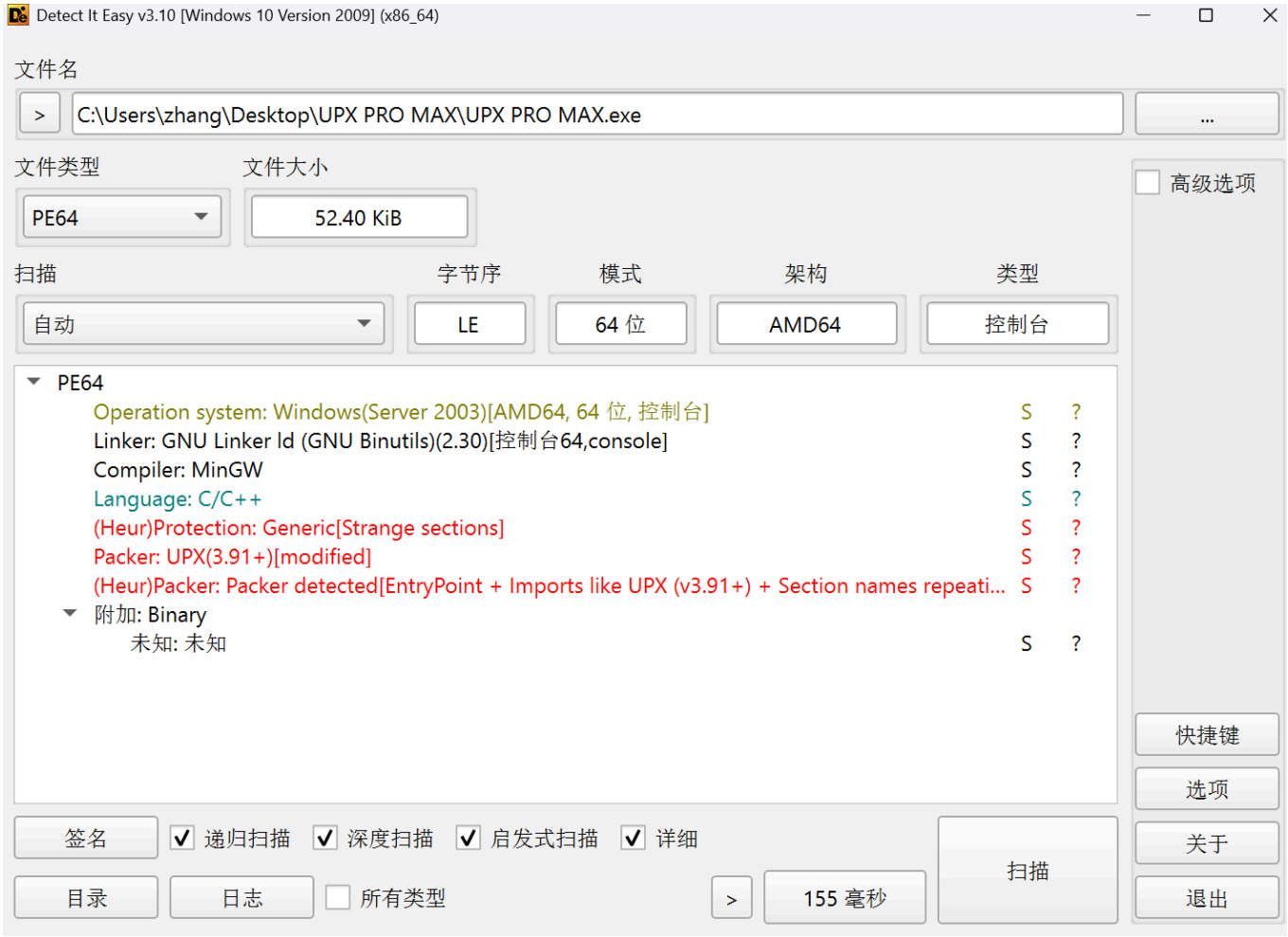
```
    # Data[k] ^= ks[k]
    return bytes([data_bytes[i] ^ ks[i] for i in range(len(data_bytes))])

def main():
    nss = build_nss_array()
    print("nss_array (hex):", nss.hex())

    # 题目中 Len_k2 为 crypt 的长度，但 init 有 bug，实际不影响 s（仍然用 len 做参数以匹配签名）
    # 这里我们随便放一个非零长度，例如 len("B2a0s2e40815") = 12 来调用 init 的接口（与实际结果无关）
    len_k2 = len("B2a0s2e40815")

    # 生成 keystream（长度 40）
    s_init = init_s_with_bug(len_k2)
    keystream = rc4_prga_bytes(s_init, 40)

    # 题目要求经过 c4(Data,Len_D,crypt,k_len) 之后 Data == nss_array
    # 即 原始 BUU ^ keystream = nss_array -> 原始 BUU = nss_array ^ keystream
    BUU = bytes([nss[i] ^ keystream[i] for i in range(40)])
    try:
        flag_str = BUU.decode('utf-8')
    except UnicodeDecodeError:
        # 若不是有效 UTF-8，强制以 latin-1 显示字节（不过通常是可读 ASCII）
        flag_str = BUU.decode('latin-1')

    print("Recovered BUU (raw bytes):", BUU)
    print("Recovered BUU (as string):")
    print(flag_str)

    # 验证：对 BUU 再运行一次 c4 应得到 nss_array
    verified = c4_xor(BUU, len_k2)
    print("Verification equals nss_array:", verified == nss)
    if verified == nss:
        print("Verified OK.")
    else:
        print("Verification failed! (unexpected)")

if __name__ == "__main__":
    main()
```

7,flag为

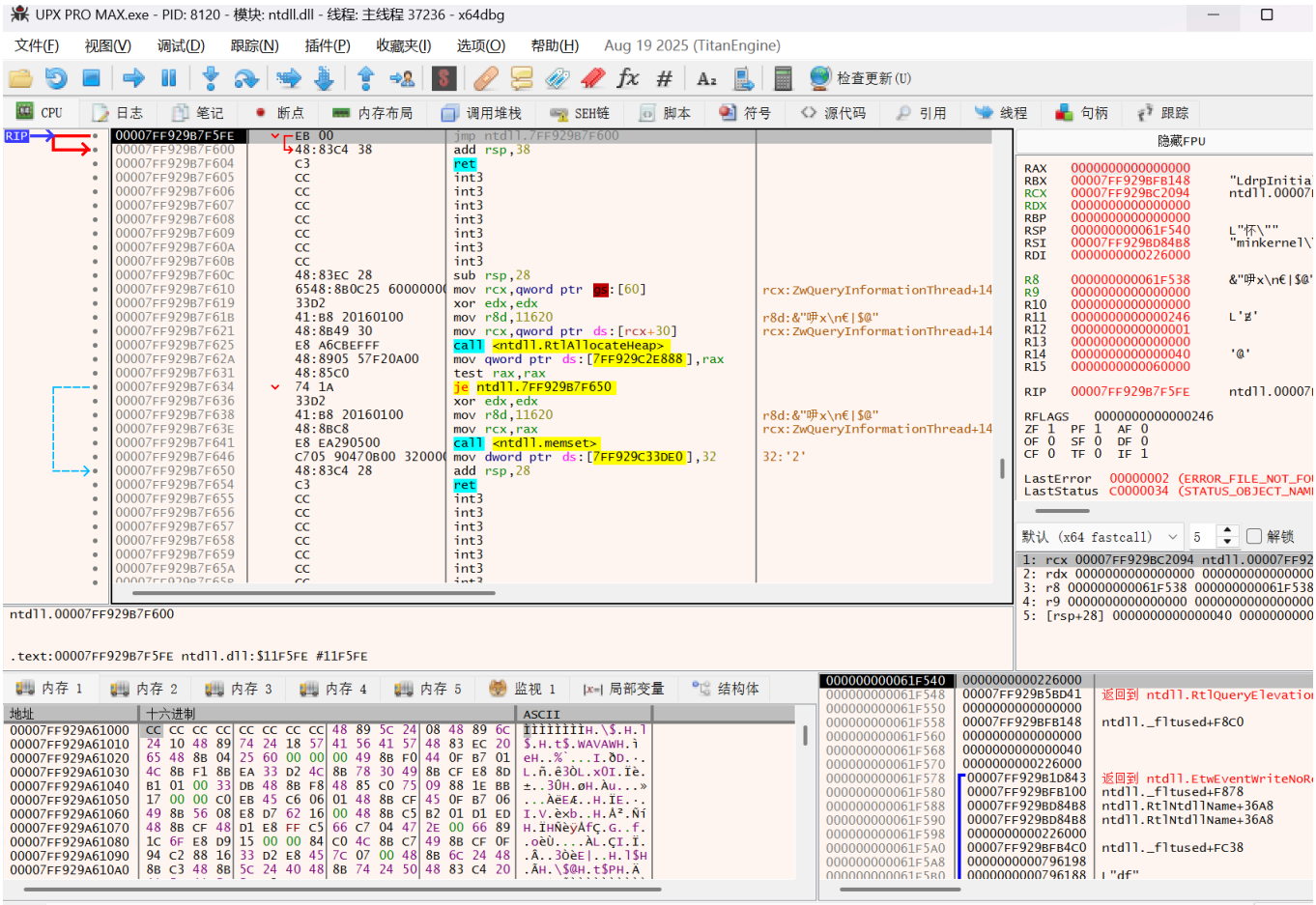
```
BaseCTF{Rc4_1$_@_G0od_3nCrypt!on_MethOd}
```

七,UPX PROMAX

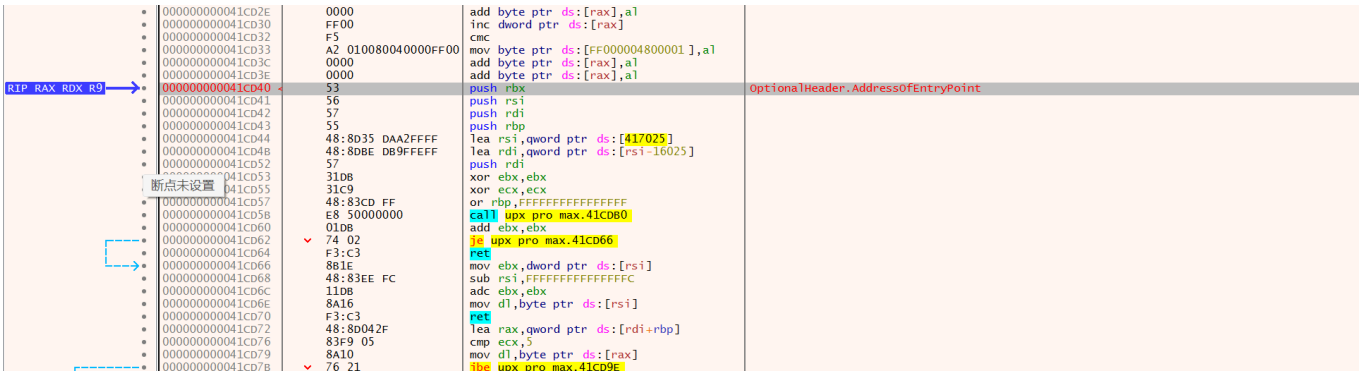
1,有壳,且无法正常脱



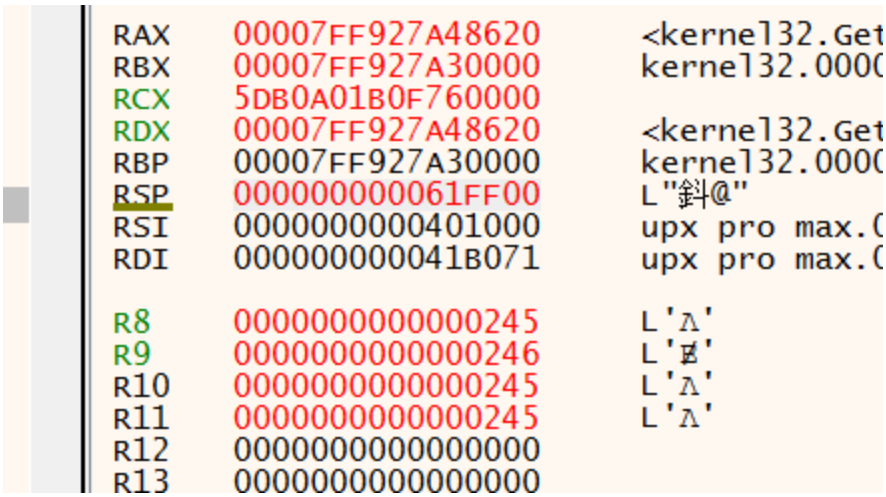
2,101中查看标志位,发现都被改了,于是用x64dbg进行分析

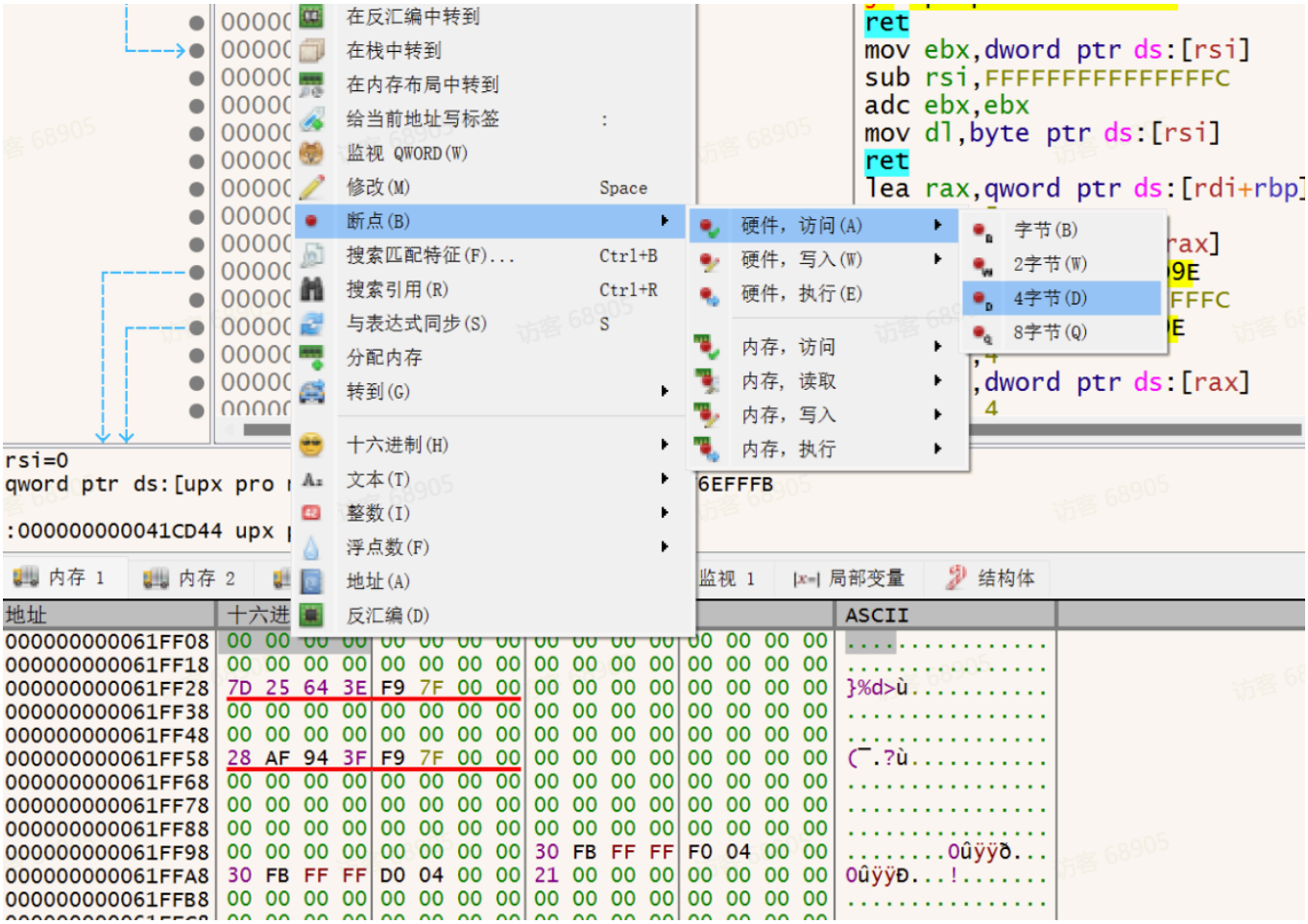


3,f9运行后观察到是esp定律



4,打开rsp的内存布局,设置断定然后再调试,即可发现第一部分解压完成了,变成了pop形式

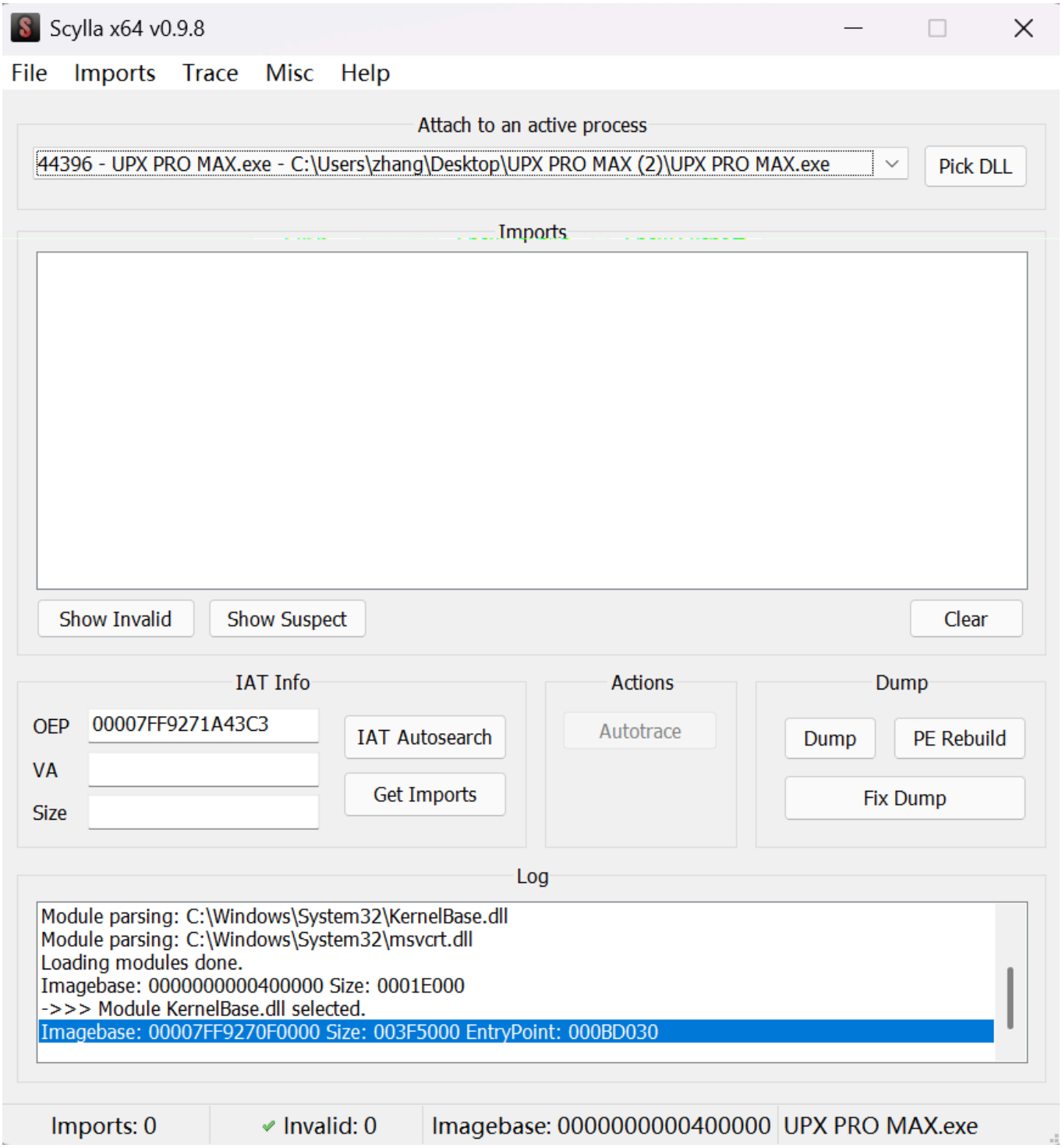



在反汇编中转到
在栈中转到
在内存布局中转到
给当前地址写标签 :
监视 QWORD(W)
修改(M) Space
断点(B)
搜索匹配特征(F)... Ctrl+B
搜索引用(R) Ctrl+R
与表达式同步(S) S
分配内存
转到(G)
十六进制(H)
文本(T)
整数(I)
浮点数(F)
地址(A)
反汇编(D)
硬件，访问(A)
硬件，写入(W)
硬件，执行(E)
内存，访问
内存，读取
内存，写入
内存，执行
字节(B)
2字节(W)
4字节(D)
8字节(Q)
ret
mov ebx,dword ptr ds:[rsi]
sub rsi,FFFFFFFFFFFFFFFC
adc ebx,ebx
mov dl,byte ptr ds:[rsi]
ret
lea rax,qword ptr ds:[rdi+rbp]
,dword ptr ds:[rax]
rsi=0
qword ptr ds:[upx pro
:000000000041CD44 upx
内存 1
内存 2
监视 1
局部变量
结构体
地址
ASCII
000000000061FF08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ....
000000000061FF18 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ....
000000000061FF28 7D 25 64 3E F9 7F 00 00 00 00 00 00 00 00 00 00 }%d>ù.............
000000000061FF38 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ....
000000000061FF48 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ....
000000000061FF58 28 AF 94 3F F9 7F 00 00 00 00 00 00 00 00 00 00 (¯.?ù............
000000000061FF68 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ....
000000000061FF78 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ....
000000000061FF88 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ....
000000000061FF98 00 00 00 00 00 00 00 00 30 FB FF FF F0 04 00 00 ....0ûÿÿð...
000000000061FFA8 30 FB FF FF D0 04 00 00 21 00 00 00 00 00 00 00 0ûÿÿÐ...!.......
000000000061FFB8 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ....

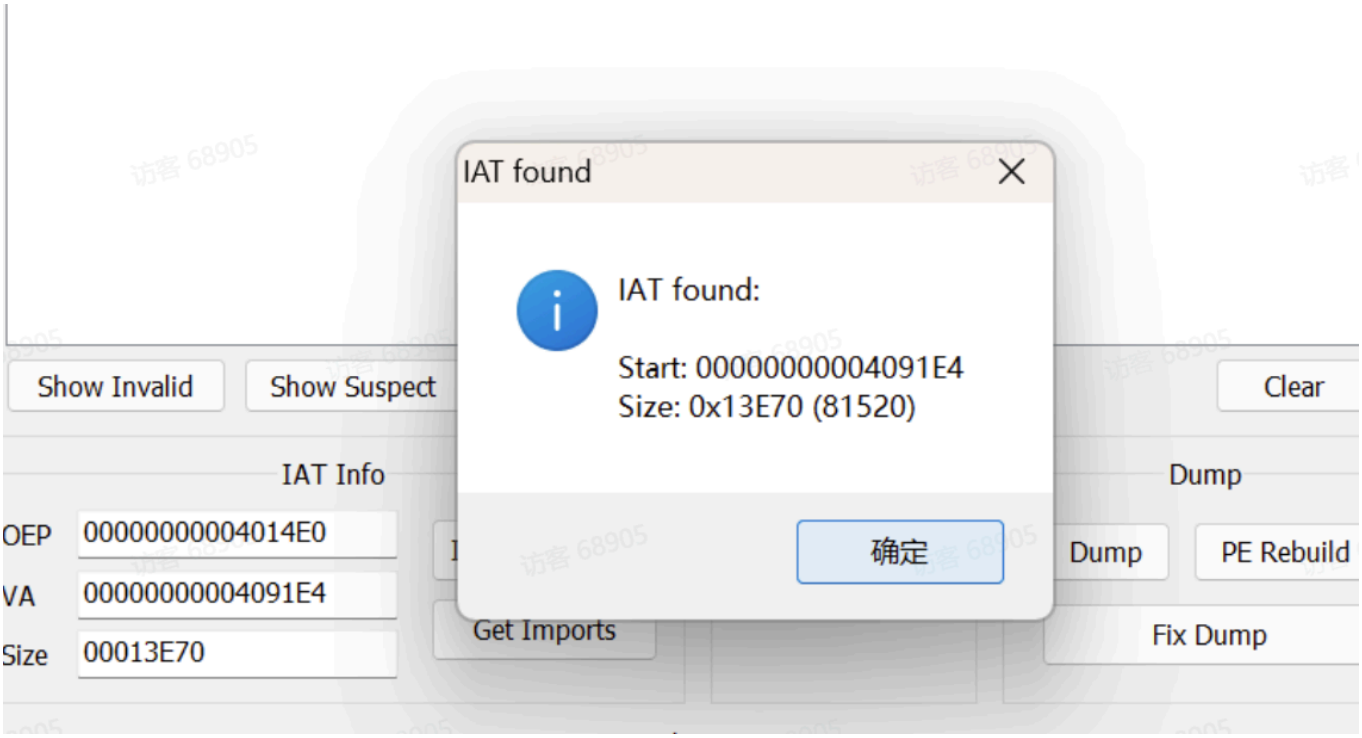
```
000000000041CF46      5A                    pop rdx
000000000041CF47      4D:31C0               xor r8,r8
000000000041CF4A      50                    push rax
000000000041CF4B      E8 1A000000           call upx pro max.41CF6A
000000000041CF50      58                    pop rax
000000000041CF51      5D                    pop rbp
000000000041CF52      5F                    pop rdi
000000000041CF53      5E                    pop rsi
000000000041CF54      5B                    pop rbx
000000000041CF55      48:8D4424 80          lea rax,qword ptr ss:[rsp-80]
000000000041CF5A      6A 00                 push 0
000000000041CF5C      48:39C4               cmp rsp,rax
000000000041CF5F    ^ 75 F9                 jne upx pro max.41CF5A
000000000041CF61      48:83EC 80            sub rsp,FFFFFFFFFFFFFF80
000000000041CF65    - E9 7645FEFF           jmp upx pro max.4014E0
000000000041CF6A      FC                    cld
000000000041CF6B      56                    push rsi
000000000041CF6C      48:8D35 CDD0FEFF      lea rsi,qword ptr ds:[40A040]
000000000041CF73      48:AD                 lodsq
000000000041CF75      48:85C0               test rax,rax
000000000041CF78    v 74 14                 je upx pro max.41CF8E
000000000041CF7A      51                    push rcx
000000000041CF7B      52                    push rdx
000000000041CF7C      41:50                 push r8
000000000041CF7E      48:83EC 28            sub rsp,28
000000000041CF82      FFD0                  call rax
000000000041CF84      48:83C4 28            add rsp,28
000000000041CF88      41:58                 pop r8
000000000041CF8A      5A                    pop rdx
000000000041CF8B      59                    pop rcx
000000000041CF8C    ^ EB E5                 jmp upx pro max.41CF73
000000000041CF8E      5E                    pop rsi
000000000041CF8F      C3                    ret
000000000041CF90      B8 CF410000           mov eax,41CF
000000000041CF95      0000                  add byte ptr ds:[rax],al
000000000041CF97      00C0                  add al,al
000000000041CF99      CF                    iretd
000000000041CF9A      41:0000               add byte ptr ds:[r8],al
000000000041CF9D      0000                  add byte ptr ds:[rax],al
000000000041CF9F      00FC                  add ah,bh
000000000041CFA1      8540 00               test dword ptr ds:[rax],eax
000000000041CFA4      0000                  add byte ptr ds:[rax],al
000000000041CFA6      0000                  add byte ptr ds:[rax],al
000000000041CFA8      C0CF 41               ror bh,41
```

5,通过f8我们可以依靠jmp跳到正确有效的函数入口,此时就可以使用scylla脱壳了

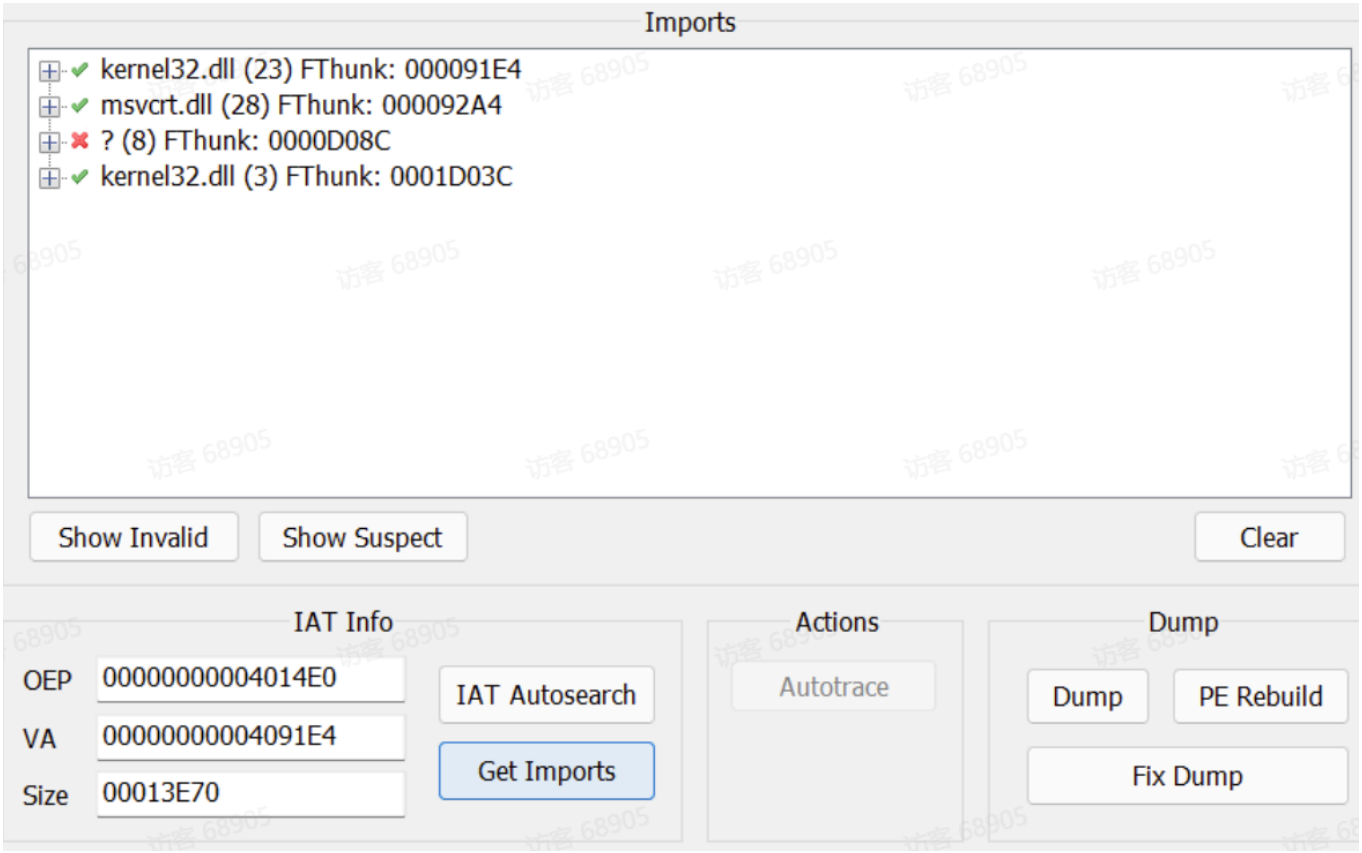
```
00000000004014E0      48:83EC 28            sub rsp,28
00000000004014E4      48:8B05 F5420000      mov rax,qword ptr ds:[4057E0]   00000000004057E0:L"藏@"
00000000004014EB      C700 00000000         mov dword ptr ds:[rax],0
00000000004014F1      E8 CA080000           call upx pro max.401DC0
00000000004014F6      E8 85FCFFFF           call upx pro max.401180
00000000004014FB      90                    nop
00000000004014FC      90                    nop
00000000004014FD      48:83C4 28            add rsp,28
0000000000401501      C3                    ret
0000000000401502      0F1F40 00             nop dword ptr ds:[rax],eax
0000000000401506      662E:0F1F8400 0000000 nop word ptr ds:[rax+rax],ax
0000000000401510      48:83EC 28            sub rsp,28
0000000000401514      E8 EF1C0000           call <JMP.&_onexit>
0000000000401519      48:85C0               test rax,rax
000000000040151C      0F94C0                sete al
000000000040151F      0FB6C0                movzx eax,al
0000000000401522      F7D8                  neg eax
0000000000401524      48:83C4 28            add rsp,28
0000000000401528      C3                    ret
0000000000401529      90                    nop
000000000040152A      90                    nop
000000000040152B      90                    nop
000000000040152C      90                    nop
000000000040152D      90                    nop
000000000040152E      90                    nop
000000000040152F      90                    nop
0000000000401530      48:8D0D 09000000      lea rcx,qword ptr ds:[401540]
0000000000401537    ^ E9 D4FEFFFF           jmp upx pro max.401510
```



6,点击Dump，然后保存好文件，再点击IAT Autosearch,



7,看到IAT已找到，再点击Get Imports，



8,点击Fix Dump,选择刚才Dump下来的文件就可以了,现在就可以ida分析了,

```
__int64 sub_401806()
{
  unsigned __int64 v1; // rbx
  unsigned __int64 v2; // rbx
  _DWORD v3[44]; // [rsp+40h] [rbp-40h] BYREF
  _QWORD v4[4]; // [rsp+F0h] [rbp+70h] BYREF
  _QWORD v5[4]; // [rsp+110h] [rbp+90h] BYREF
  _QWORD v6[4]; // [rsp+130h] [rbp+B0h] BYREF
  _QWORD v7[4]; // [rsp+150h] [rbp+D0h] BYREF
  _QWORD v8[4]; // [rsp+170h] [rbp+F0h] BYREF
  _QWORD v9[4]; // [rsp+190h] [rbp+110h] BYREF
  _BYTE v10[48]; // [rsp+1B0h] [rbp+130h] BYREF
  char v11[52]; // [rsp+1E0h] [rbp+160h] BYREF
  int j; // [rsp+214h] [rbp+194h]
  int i; // [rsp+218h] [rbp+198h]
  int n6; // [rsp+21Ch] [rbp+19Ch]

  sub_401D80();
  sub_4031B8(asc_405000);                       // "||   / |  / /                                                                  //   ) )                                                  "
  sub_4031B8(asc_4050A0);                       // "||  /  | / /  ___      //  ___      ___      _  __      ___      __  ___  ___      //___/ /    ___      ___      ___          "
  sub_4031B8(asc_405140);                       // "|| / /||/ / //___) ) // //   ) ) //   ) ) //   ) ) ) ) //___) )    / /   //   ) )    / __  (   //   ) ) ((   ) ) //___)     "
  sub_4031B8(asc_4051E0);                       // "||/ / |  / //       // //       //   / / // / /  / / //           / /   //   / /    //   ) ) //   / /   \\ \\    //          "
  sub_4031B8(asc_405280);                       // "|  /  | / ((____   // ((____   ((___/ / // / /  / / ((____      / /   ((___/ /    //___/ / ((___( ( //   ) ) ((____      "
  qword_40926C(500);
  sub_4031B8(aAtThisPointShe);                  // "At this point, Shell's learning comes to an end."
  sub_4031B8(aIHopeYouEnjoye);                  // "I hope you enjoyed it."
  sub_4031B8(aPlzInputYourFl);                  // "plz input your flag:"
  memset(v9, 0, sizeof(v9));
  memset(v8, 0, sizeof(v8));
  memset(v7, 0, sizeof(v7));
  memset(v6, 0, sizeof(v6));
  memset(v5, 0, sizeof(v5));
  memset(v4, 0, sizeof(v4));
  v3[42] = 0;
  v3[0] = 34;
  v3[1] = 17;
  v3[2] = 23;
  v3[3] = 33;
  v3[4] = 22;
  v3[5] = 17;
  v3[6] = 60;
  v3[7] = 61;
  v3[8] = 36;
00000BCD sub_401806:40 (4019CD)
```

9,这里就很简单了,前面去壳是真几把麻烦,这里扔给gpt再让他进行异或运算就可以,脚本如下

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <math.h>
#include <stdbool.h>
#include <windows.h>
#include <winternl.h>

int main() {
    int enc[] = {0x22, 0x11, 0x17, 0x21, 0x16, 0x11, 0x3C, 0x23, 0x65, 0x5C,
                 0x2E, 0x74, 0x7C, 0x7D, 0x6D, 0x72, 0x6C, 0x0E, 0x36, 0x34,
                 0x64, 0x42, 0x57, 0x4E, 0x3B, 0x24, 0x36, 0x3A, 0x2C, 0x6D,
                 0x43, 0x13, 0x7A, 0x68, 0x11, 0x3D, 0x24, 0x10, 0x2E, 0x52,
                 0x5D, 0x29};

    for (int i = 41; i > 0; i--) {
        enc[i - 1] = enc[i - 1] ^ enc[i];
    }

    for (int j = 0; j < 42; j++) {
        printf("%c", enc[j] ^ j ^ '}');
    }

    return 0;
}
```

10,(hy告诉我了个简单方法,不用断点调试,f9运行到cmd卡住,此时直接dump就出来了)