

# 华中农业大学课程实验报告

课程名称: 计算机组成原理

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报告日期:	2023/6/2

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## 华中农业大学计算机组成原理实验报告原创性声明

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## 一、实验目的

- 1. 参考提供的实验指导和资料,基于 MIPS 指令集,设计一个 20+的单周期 CPU。
- 2. 采用 VerilogHDL 语言进行设计,并下载到 FPGA 开发板上。
- 3. 能跑测试程序,并利用开发板上的显示单元进行指令的跟踪执行。

## 二、实验环境

- 1. 操作系统: Windows7
- 2. 编译器: Quartus II
- 3. 芯片: Cydone V: 5CSEMA5F31C6

## 三、实验设计与步骤

### 1、设计基本器件

### ● 算术逻辑单元 (alu)

```
module alu(a,b,aluc,r,z,v);
          output wire v;
          input [31:0] a_, b_;
          input [3:0] aluc_;
          output [31:0] r;
          output z;
          wire [31:0] d_and=a_&b_;
          wire [31:0] d or=a |b;
          wire [31:0] d_xor=a_^b_;
          wire [31:0] d_lui={b_[15:0], 16'h0};
          wire [31:0] d_and_or=aluc_[2]?d_or:d_and;
          wire [31:0] d_xor_lui=aluc_[2]?d_lui:d_xor;
          wire [31:0] d_as/*synthesis keep*/;
          wire [31:0] d_sh/*synthesis keep*/;
          assign v = ~aluc [2] & ~a [31] & ~b [31] & r[31] & ~aluc [1] & ~aluc [0] |
           ~aluc_[2] & a_[31] & b_[31] &~r[31] & ~aluc_[1] & ~aluc_[0] |
                                  aluc_[2] & ~a_[31] & b_[31] & r[31] & ~aluc_[1] & ~aluc_[0]
|aluc_[2] & a_[31] & ~b_[31] & ~r[31] & ~aluc_[1] & ~aluc_[0] ;
          addsub32 as32(a_, b_, aluc_[2], d_as);
          shift shifter(b, a [4:0], aluc [2], aluc [3], d sh);
          mux4x32 select(d_as, d_and_or, d_xor_lui, d_sh, aluc_[1:0], r);
          assign z=^{\sim}|r;
endmodule
```

#### ● 寄存器组

```
/*
    该模块为寄存器组
输入有 rf_clk(时钟), rw ra rb(5 位 选择寄存器地址); busW(32 位 写入寄存器内容); RegWr(1 位 写使能)
输出有 busA busB(32 位 输出寄存器内容)
*/
module regfile(rf_clk, rw, ra, rb, busW, RegWr, busA, busB, reset);
input [4:0] rw, ra, rb;
```

#### ● 拓位器

```
//符号拓展器 16-30
//根据 flag 1 是符号拓展
//根据 flag 0 是零拓展
//其他为异常情况
module extendedThirty(in, out, flag);
input [15:0]in;
output reg [29:0]out;
input flag;
always@(*)
begin
          case (flag)
          1'b1:if(in[15]==1)out={{14{1'b1}}, in};
                               else out=\{\{14\{1'b0\}\}, in\};
          1'b0:out = \{\{14\{1'b0\}\}, in\};
          endcase
end
endmodule
//符号拓展器 16-32
//根据 flag 1 是符号拓展
//根据 flag 0 是零拓展
//其他为异常情况
module extendedThirtyTwo(in, out, flag);
input [15:0]in;
output reg [31:0]out;
input flag;
always@(*)
begin
          case (flag)
          1'b1:if(in[15]==1)out=\{\{16\{1'b1\}\}, in\};
                              else out=\{\{16\{1'b0\}\}, in\};
          1'b0:out = \{\{16\{1'b0\}\}, in\};
          endcase
end
end module \\
```

#### ● 选择器

```
/*
    该模块为 5 位 2 选 1 选择器
输入有 in0, in1(5 位 待选数据); ctr(1 位 选择信号)
输出有 out(5 位 选择的数据)
*/
module mux2x5(in0, in1, ctr, out);
input [4:0] in1, in0;
input ctr;
```

```
output [4:0] out;
assign out = ctr?in1:in0;
Endmodule
该模块为32位2选1选择器
输入有 in0, in1(32位 待选数据); ctr(1位 选择信号)
输出有 out (32 位 选择的数据)
module mux2x32(in0, in1, ctr, out);
input [31:0] in1, in0;
input ctr;
output [31:0] out;
assign out = ctr?in1:in0;
Endmodule
module mux4x32 (a0, a1, a2, a3, s, y);
          input [31:0] a0, a1, a2, a3;
          input [1:0] s;
          output [31:0] y;
          function [31:0] select;
                   input [31:0] a0, a1, a2, a3;
                   input [1:0] s;
                   case (s)
                             2'b00: select = a0;
                             2'b01: select = a1;
                             2'b10: select = a2;
                             2'b11: select = a3;
                   endcase
          endfunction
         assign y = select(a0, a1, a2, a3, s);
endmodule
```

#### ● 移位器

```
module shift (d, sa, right, arith, sh);
    input [31:0] d;
     input [4:0] sa;
     input right, arith;
    output [31:0] sh;
    reg [31:0] sh;
    always @* begin
         if (!right) begin
             sh = d \ll sa;
         end else if (!arith) begin
             sh = d \gg sa;
          end else begin
             sh = $signed(d) >>> sa;
         end
    end
endmodule
```

#### ● 指令存储器 ROM

```
/*
    该模块为读取指令模块
    输入为 addr(5 位 指令地址)
    输出为 inst(32 位 指令)
*/
module scinstmem (a, inst);
    input [31:0] a;
    output [31:0] inst;
```

```
wire [31:0] rom [0:48];
                                                   ori r4, r1, 80
/* 不带异常的程序 assign rom[5'h00] = 32'h3c010000;
                                                    // (00) main: lui r1,0
        assign rom[5'h01] = 32'h34240050;
                                           // (04)
        assign rom[5'h02] = 32'h20050004;
                                            // (08)
                                                       addi r5, r0, 4
        assign rom[5'h03] = 32'h0c000018;
                                            // (0c)call: jal sum .0110.0000
        assign rom[5'h04] = 32'hac820000;
                                            // (10)
                                                     sw r2,0(r4)
        assign rom[5'h05] = 32'h8c890000;
                                            //
                                                     (14)
                                                                       1w
        r9, 0 (r4)
        assign rom[5'h06] = 32'h01244022;
                                            //
                                                     (18)
                                                                       sub
        r8, r9. r4
        assign rom[5'h07] = 32'h20050003;
                                            //
                                                     (1c)
                                                                      addi
        r5, r0. 3
        assign rom[5'h08] = 32'h20a5ffff;
                                            //
                                                     (20) loop2: addi
                                                                      r5,
        r5, -1
        assign rom[5'h09] = 32'h34a8ffff;
                                                     (24)
                                                                      ori
        r8, r5, 0xffff
        assign rom[5'hOA] = 32'h39085555;
                                            //
                                                     (28)
                                                                      xori
        r8. r8, 0x5555
        assign rom[5'hOB] = 32'h2009fffff;
                                            //
                                                     (2c)
                                                                      addi
        r9, r0, -1
        assign rom[5'h0C] = 32'h312affff;
                                            //
                                                     (30)
                                                                      andi
        r10, r9, 0xffff
        assign rom[5'hOD] = 32'hO1493025;
                                            //
                                                     (34)
                                                                      or
        r6. r10, r9
        assign rom[5'h0E] = 32'h01494026;
                                            //
                                                     (38)
                                                                       xor
                         r9
        r8, r10,
        assign rom[5'h0F] = 32'h01463824;
                                                     (3c)
                                                                      and
        r7, r10, r6
        assign rom[5'h10] = 32'h10a00001;
                                                     (40)
                                                                      bea
        r5, r0, shift
        assign rom[5'h11] = 32'h08000008;
                                            //
                                                     (44)
                                                                       j
        assign rom[5'h12] = 32'h2005ffff;
                                                     (48) shift: addi
        r0, -1
        assign rom[5'h13] = 32'h000543c0;
                                            //
                                                     (4c)
                                                                       s11
        r8. r5. 15
        assign rom[5'h14] = 32'h00084400;
                                            //
                                                     (50)
                                                                       s11
        r8, r8, 16
        assign rom[5'h15] = 32'h00084403;
                                            //
                                                     (54)
                                                                       sra
        r8, r8, 16
        assign rom[5'h16] = 32'h000843c2;
                                            //
                                                     (58)
                                                                       srl
        r8. r8. 15
        assign rom[5'h17] = 32'h08000017;
                                            //
                                                     (5c) finish:
                                                                       j
        assign rom[5'h18] = 32'h00004020;
                                            //
                                                     (60) sum: add
                                                                      r8,
        r0, r0
        assign rom[5'h19] = 32'h8c890000;
                                            //
                                                     (64) loop: lw
                                                                      r9,
        assign rom[5'h1A] = 32'h20840004;
                                            //
                                                     (68)
                                                                      addi
        r4, r4, 4
        assign rom[5'h1B] = 32'h01094020;
                                            //
                                                     (6c)
                                                                      add
        r8, r8,
                         r9
        assign rom[5'h1C] = 32'h2Oa5ffff;
                                            //
                                                     (70)
                                                                      addi
        r5, r5, -1
        assign rom[5'h1D] = 32'h14a0fffb;
                                            //
                                                     (74)
                                                                      bne
        r5, r0, loop
        assign rom[5'h1E] = 32'h00081000;
                                                     (78)
                                                                       s11
        r2f r8f 0
```

```
assign rom[5'h1F] = 32'h03e00008; //
                                                              (7c)
                                                                                  jr
                              0000 0011 1110 0000*/
          assign rom[6'h00] = 32'h0800 001d; //带异常的程序
          assign rom[6'h01] = 32'h0000_0000; //
          assign rom[6'h02] = 32'h401a_6800; //
          assign rom[6'h03] = 32'h335b_000c; //
          assign rom[6'h04] = 32'h8f7b 0020;
                  rom[6' h05] = 32' h0000 0000;
          assign
                   rom[6' h06] = 32' h0360 0008:
          assign
                   rom[6' h07] = 32' h0000 0000:
          assign
                    rom[6'h0C] = 32'h0000_0000;
          assign
                    rom[6'h0D] = 32'h4200 0018;
          assign
                    rom[6'hOE] = 32'hOOOO_0000;
          assign
                    rom[6'h0F] = 32'h0000 0000;
          assign
                    rom[6' h10] = 32' h401a_7000;
          assign
                    rom[6'h11] = 32'h235a_0004;
          assign
          assign
                    rom[6'h12] = 32'h409a_7000;
          assign
                    rom[6'h13] = 32'h4200_0018;
          assign
                    rom[6'h14] = 32'h0000_0000;
                    rom[6' h15] = 32' h0000_0000;
          assign
                    rom[6'h16] = 32'h0800 0010;
          assign
                    rom[6'h17] = 32'h0000_0000;
          assign
                    rom[6'h1A] = 32'h0000 0000;
          assign
                    rom[6'h1B] = 32'h0800 0010;
          assign
                    rom[6'h1C] = 32'h0000 0000;
          assign
          assign
                    rom[6' h1D] = 32' h2008 000f;
          assign
                    rom[6'h1E] = 32'h4088_6000;
          assign
                    rom[6'h1F] = 32'h8c08 0048;
                    rom[6' h20] = 32' h8c09_004c;
          assign
                    rom[6' h21] = 32' h0109_4020;
          assign
          assign
                    rom[6' h22] = 32' h0000_0000;
          assign
                    rom[6' h23] = 32' h0000 000c;
                    rom[6' h24] = 32' h0000 0000;
          assign
                    rom[6'h25] = 32'h0128 001a;
          assign
                    rom[6'h26] = 32'h0000_0000;
          assign
                    rom[6' h27] = 32' h3404 0050;
          assign
                    rom[6'h28] = 32'h2005 0004;
          assign
                    rom[6' h29] = 32' h0000 4020;
          assign
                    rom[6' h2a] = 32' h8c89 0000;
          assign
                    rom[6' h2b] = 32' h2084_0004;
          assign
                    rom[6' h2c] = 32' h0109_4020;
          assign
          assign
                    rom[6' h2d] = 32' h20a5_fffff;
          assign
                    rom[6'h2e] = 32'h14a0_fffb;
                    rom[6' h2f] = 32' h0000_0000;
          assign
                    rom[6'h30] = 32'h0800 0030;
          assign
          assign inst = rom[a[7:2]];
endmodule
```

#### ● 数据存储器 RAM

```
module scdatamem(WrEn, Adr, Clk, DataIn, DataOut);
input Clk;
input WrEn;
input [31:0] Adr, DataIn;//地址是 32 位
output [31:0] DataOut;
reg [31:0] data [31:0];
assign DataOut=data[Adr[6:2]];
always@(posedge Clk)
```

```
begin
          if (WrEn)
          data[Adr[6:2]]=DataIn;
end
integer i;
initial begin
          for (i = 0; i < 32; i = i + 1)
                    data[i] = 0;
          data[5'h08] = 32'h0000 0030;//异常处理程序的地址
          data[5'h09] = 32'h0000 003c;
          data[5'h0a] = 32'h0000_0054;
          data[5'h0b] = 32'h0000 0068;
          data[5'h12] = 32'h0000_0002;
          data[5'h13] = 32'h7fff ffff;
          data[5'h14] = 32'h0000_00A3;
          data[5'h15] = 32'h0000_0027;
          data[5'h16] = 32'h0000_0079;
          data[5'h17] = 32'h0000_0115;
end
end module \\
```

### 2、 分析指令 (确定要实现的功能)

```
s11/sr1/sra rd, rt, sa # rd <--rt shift sa
```

这是3条移位指令(Shift Left/ Right Logical/Arithmetic),5位的sa (Shift Amount)指定移位的位数。

```
lui rt, imm # rt <-- imm << 16
```

1ui (Load Upper Immediate)指令把 16 位立即数 imm 左移 16 位,存入 rt 寄存器。它与 ori 指令合作,可以为一个 32 位的寄存器赋任意值: 1ui 赋高 16 位, ori 赋低 16 位。

```
addi rt, rs, imm # rt <-- rs+ imm(符号扩展)
```

addi (Add Immediate)是立即数的加法指令。注意目的寄存器号是 t,立即数要符号扩展到 32 位。因为是符号扩展,因此 MIPS 指令系统中没有类似于 subi 这样的指令。

```
andi/ori/xori rt, rs, imm # rt<-- rs op imm(零扩展)
```

这3条是逻辑操作指令(And/Or/Xor Immediate), 因此立即数要零扩展。

```
1W rt, offset (rs) # rt <-- memory[rs + offset ]</pre>
```

lw (Load Word) 是一一条取存储器字的指令。寄存器 rs 的内容与符号扩展的 offset 相加,得到存储器地址。从存储器取来的数据存人 rt 寄存器。注意,offset 就是前面讲的立即数。

```
SW rt, offset (rs) # memory[rs + offset ] <-- rt
```

SW(Store Word)是一条存字的指令,与 lw 方向相反,把 rt 寄存器的内容放入存储器。存储器地址的计算与 lw 相同。

#### beq rs, rt, label # if (rs==rt) PC <-- label

beq (Branch on Equal)是一-条条件转移指令。当寄存器 rs 的内容与寄存器 rt 的内容相等时,转移到 label。如果程序计数器 PC 是 beq 指令的地址,则 label= PC+4 +offset << 2。offset 左移两位导致 PC 的最低两位永远是 0,这是因为 PC 是字节地址而一条指令要占 4 个字节。offset 是要符号扩展的,因此 beq 能实现向前和向后两种转移。

#### bne rs, rt, label # if(rs != rt)PC<-- label

与 beq 类似, 但 bne (Branch on Not Equal)是在两个寄存器的内容不相等时转移。

#### j target # PC <-- target

**j(Jump)是**一条跳转指令。target 是跳转的目标地址,32 位,由3 部分组成:最高4位来自于PC+4的高4位,中间26位是指令中的address,最低两位为0。这条指令在生成目标地址时不需要任何电路进行计算,只需把3部分地址拼接起来就行。以下的两条指令也不需要计算。

#### **jal** target # r31<-, - PC + 8; PC <-- target

jal (Jump and Link)指令与 j 类似, 但要把返回地址保存在 r31 中。即 jal 是子程序调用指令。jal 下一条指令的地址是 PC+4,为什么返回地址是 PC+8?这是因为 MIPS 指令系统实现流水线的延迟转移功能,详见第8章。注意,寄存器号 31 是约. 定好的,该号码并不出现在指令中。因此在设计电路时,应当由硬件为 jal 指令产生这个号码。

#### **jr** rs #PC<-- rs

jr (Jump Register)也是一条跳转指令,它把rs寄存器的内容写入PC。如果指定rs为31,则 jr是从子程序返回的指令。

#### 到此, 基本指令格式与功能分析完毕

3、 根据指令设计基本器件之间的连接方式(数据通路)

1. 首先看 add 指令可以当实现了这条指令后带有 3 个寄存器的 r 型指令就基本实现了

#### 【1】带有3个寄存器

指令	[31 : 26]	[25 : 21]	[20 : 16]	[15 : 11]	[10 : 6]	[5:0]	指令功能
add	000000	rs	rt	rd	00000	100000	寄存器加
sub	000000	rs	rt	rd	00000	100010	寄存器减
and	000000	rs	rt	rd	00000	100100	寄存器与
or	000000	rs	rt	rd	00000	100101	寄存器或
xor	000000	rs	rt	rd	00000	100110	寄存器异或

#### 2. 然后再实现带有两个寄存器的 r 型指令

#### 【2】带有2个寄存器

指令	[31 : 26]	[25 : 21]	[20 : 16]	[15 : 11]	[10 : 6]	[5:0]	指令功能
sll	000000	00000	rt	rd	sa	100000	逻辑左移
srl	000000	00000	rt	rd	sa	000010	逻辑右移
sll	000000	00000	rt	rd	sa	000011	算术右移

#### 3.之后再实现带有一个寄存器的 r 型指令

#### 【3】带有1个寄存器

指令	[31 : 26]	[25 : 21]	[20 : 16]	[15 : 11]	[10 : 6]	[5:0]	指令功能
jr	000000	rs	00000	00000	00000	001000	寄存器跳转

#### 4.最后再实现 I 型指令和 J 型指令

#### 【1】面向运算的I型指令

指令	[31 : 26]	[25 : 21]	[20 : 16]	[15 : 0]	指令功能
addi	001000	rs	rt	imm	寄存器和立即数"加"
andi	001100	rs	rt	imm	寄存器和立即数"与"
ori	001101	rs	rt	imm	寄存器和立即数"或"
xori	001110	rs	rt	imm	寄存器和立即数"异或"

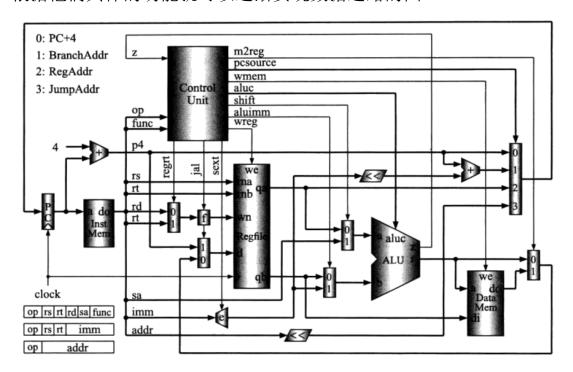
#### 【2】面向访存的I型指令

指令	[31 : 26]	[25 : 21]	[20 : 16]	[15 : 0]	指令功能
lw	100011	rs	rt	imm	从存储器种读取数据
SW	101011	rs	rt	imm	把数据保存到存储器

#### (2) 具体J型指令

指令	[31 : 26]	[25 : 0]	指令功能
j	000010	address	无条件跳转
jal	001100	address	调用与联接

## 根据他们具体的功能就可以逐渐实现数据通路的图



具体每条指令数据通路图<sup>[1]</sup>的设计就不再重复了,就是跟踪一条指令从开始到结束的具体过程。

其中就包括设计控制信号产生器。

表 5.3 控制信号的真值表

指令	z	wreg	regrt	jal	m2reg	shift	aluimm	sext	aluc[3:0]	wmem	pcsource[1:0]
add	х	1	0	0	0	0	0	х	x 0 0 0	0	0 0
sub	x	1	0	0	0	0	0	x	x 1 0 0	0	0 0
and	х	1	0	0	0	0	0	x	x 0 0 1	0	0 0
or	x	1	0	0	0	0	0	x	x 1 0 1	0	0 0
xor	x	1	0	0	0	0	0	x	x 0 1 0	0	0 0
sll	х	1	0	0	0	1	0	x	0011	0	0 0
srl	x	1	0	0	0	1	0	x	0111	0	0 0
sra	х	1	0	0	0	1 .	0	x	1111	0	0 0
jr	x	0	x	x	x	x	x	x	xxxx	0	1 0
addi	х	1	1	0	0	0	1	1	x 0 0 0	0	0 0
andi	x	1	1	0	0	0	1	0	x 0 0 1	0	0 0
ori	x	1	1	0	0	0	1	0	x 1 0 1	0	0 0
xori	x	1	1	0	0	0	1	0	x 0 1 0	0	0 0
lw	x	1	1	0	1	0	1	1	x 0 0 0	0	0 0
sw	х	0	х	х	x	0	1	1	x 0 0 0	1	0 0
beq	0	0	X .	х	x	0	0	1	x 0 1 0	0	0 0
beq	1	0	- x	х	x	0	0	1	x 0 1 0	0	0 1
bne	0	0	x	х	x	0	0	1	x 0 1 0	0 ,	0 1
bne	1	0	х	х	x	0	0	1	x 0 1 0	0	0 0
lui	x	1	1	0	0	x	1	х	x 1 1 0	0	0 0
j	x	0	х	х	x	x	x	x	xxxx	0	1 1
jal	x	1	x	1	x	x	x	x	xxxx	0	11

我们在设计控制信号产生器使用的是类似设计微程序一样的,面向指令写控制信号,每条指令对应控制信号的值不同[1](详情请看代码文件)。

#### 4、设计中断与异常的总体思路(设计要实现的功能)

- 1. 首先搞清楚中断和异常(溢出异常、外部中断、系统中断、未知指令异常)的大致过程,具体过程包括一下步骤:
- (1) 检测异常(确认异常、关中断、保存地址、跳转)
- (2) 处理异常
- (3) 返回主程序
- 2. 根据要实现的异常设计, 检测异常的控制信号产生器
- 3. 设计处理异常程序(写在指令储存器(rom)中)
- 4. 设计返回主程序的功能

其中第一步是直接硬件实现的,后两步是通过实现四条指令来实现的。

	31				26	25				21	20				16	15				11	10										0
mfc0 rt, rd	0 1	0	0	0	0	0	0	0	0	0			rt					rd			0	0	0	0	0	0	0	0	0	0	0
																															_
mtc0 rt, rd	0 1	0	0	0	0	0	0	1	0	0			rt					rd			0	0	0	0	0	0	0	0	0	0	0
	31				26	25																			6	5					0
syscall	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
																															_
eret	0 1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0

### 5、 分析四条异常指令(分析要实现的功能)

mfc0 rt, rd # (rt) <--c0

mfc0 是将三个异常与中断寄存器中的内容移到指定的内存中。

mtc0 rt, rd # ct<--(rt)

mtc0 是将内存中的内容移到指定异常与中断寄存器。

#### syscall 实现系统调用

eret

#### eret 实现返回和开中断

6、根据异常与中断功能和四个异常指令添加相关器件的连接方式

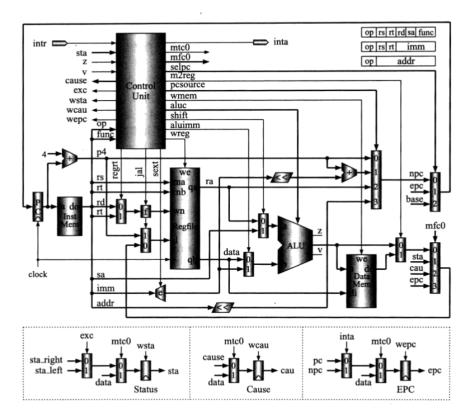


图 6.11 带有处理异常或中断功能的单周期 CPU

可以看见 ram 的数据来源增加了异常寄存器<sup>[1]</sup>,下址 pc 生成也增加了 base (异常处理程序的总入口),epc(保存的返回地址)。

## 四、过程与调试

1、Signaltap 仿真(调试和 debug)

#### 仿真调试的步骤:

经过非常多次的调试(总共花的时间要比编写程序花的时间要多几倍)可以总结出来一般步骤:

- 首先是分析错误出错的大概位置(例如执行到某个指令后出现死循环)
- 在 signaltap 中添加关心的信号,可以删除不关心的信号,因为可能导致编译速度过慢。

● 然后分析结果,把所有的可能原因考虑一下,逐渐缩小范围,最终找到错误的地方。

因为调试过程十分繁琐复杂,并且看似 signaltap 出现的错误相同但是导致他们的原因却可能大相径庭,所以没有保存这个过程中的截图,仅说明几点需要注意的地方:

- 注意变量名,如果使用变量较多十分容易产生这个问题,大小写不同导致使用的变量不是一个,然后也没有报错,排查起来十分费神费力。
- 注意参数对应,使用对应的模块时,传入参数如果不对应,Quartus II 也不会报错,但是实现不了想要的功能,排查起来也比较麻烦。
- 注意要设置触发器,上升沿有效,才能把运行的结果锁定住,不然执行过快, 还没来得及暂停就已经过去了。

### 2、实验结果

### 1. 带异常和中断的 signaltap 仿真结果

第一行是 pc 就是指令地址,可以看出在 00000084h 发生异常进入到总的异常程序处理入口 00000008h 然后在 000000018h 进入到处理异常程序的入口为 000000068h 最终在 0000004ch 返回主程序 00000088h,剩下的对照测试程序和处理异常程序的地址同理可以看出

Name	-1 0	1	2	3 4		5	1		Β 1	1	0 1	1 12	13	14
reset														
main_dataflow:comb_4 pc[310]	00000000h	00000074h	00000078h	0000007Ch	00000080h	00000084h	00000008h	0000000Ch	00000010h	00000014h	00000018h	00000 d8h	0000004	10h X 00000044h
main_dataflow:comb_4 inst[310]	0800001Dh	2008000Fh	40886000h	8C080048h	8C09004Ch	01094020h	401A6800h	335B000Ch	8F7B0020h	00000000h	03600008h	00000000h 08000	0010h X 401A700	00h X 235A0004
● main_dataflow:comb_4 alu:alu0 a_[310]	000000001		00000060h	00000	0000h	00000002h	00000000h	0000	000Ch	00000000h	00000068h	00000	0000h	00000084
⊞ main_dataflow:comb_4 alu:alu0 b_[310]	00000000h	0000	000Fh	00000048h	0000004Ch	7FFFFFFh	00000098h	0000000Ch	00000020h		0000	0000h	0000000	Ch 00000004
main_dataflow:comb_4 alu:alu0 r[310]	00000000h	0000000Fh	0000006Fh	00000048h	0000004Ch	80000001h	00000098h	0000000Ch	0000002Ch	00000000h	00000068h	00000000h	0000000	Ch 00000088
nain_dataflow:comb_4 alu:alu0 z		٦												
main_dataflow:comb_4 mux2x5:mux0 in0[40]	00h		0Ch	X 00	)h	08h	( ODh	$\overline{}$		00	)h		( OEh	( 00h
main_dataflow:comb_4 mux2x5:mux0 in1[40]	0Qh	Х	08h		<u> </u>	19h	1Ah	1	Bh		0	0h	X	1Ah
main_dataflow:comb_4 mux2x5:mux0 out[40]	00h	( 08h	0Ch	( 08h	09h	( 08h	1Ah		Bh		0	0h	X	1Ah
main_dataflow:comb_4 mux2x32:mux1 in0[310]	000000001		00000060h	00000	0000h	00000002h	00000000h	0000	000Ch	00000000h	00000068h	00000	0000h	00000084
main_dataflow:comb_4 mux2x32:mux1 in1[310]	000	00000h		00000	0001h	Х				0000	0000h			
main_dataflow:comb_4 mux2x32:mux1 out[310]	000000001		00000060h	00000	0000h	00000002h	00000000h	( 0000	000Ch	00000000h	00000068h	00000	0000h	00000084
main_dataflow:comb_4 mux2x32:mux2 in0[310]	00000000h	00000258h	( 0000	000Fh	00000115h	7FFFFFFh	00000098h	00000054h	0000000Ch		0000	0000h	0000000	Ch 00000084
main_dataflow:comb_4 mux2x32:mux2 in1[310]	0000001Dh	0000000Fh	00006000h	00000048h	0000004Ch	00004020h	00006800h	0000000Ch	00000020h	00000000h	00000008h	00000000h 00000	0000700 0000700	10h X 00000004
main_dataflow:comb_4 mux2x32:mux2 out[310]	00000000h	0000	000Fh	00000048h	0000004Ch	7FFFFFFh	00000098h	0000000Ch	00000020h		0000	0000h	0000000	Ch 00000004
main_dataflow:comb_4 mux2x32:mux3 in0[310]	00000000h	0000000Fh	0000006Fh	00000048h	0000004Ch	80000001h	00000098h	0000000Ch	0000002Ch	00000000h	00000068h	00000000h	0000000	Ch 00000088
main_dataflow:comb_4 mux2x32:mux3 in1[310]	000	00000h		00000002h	7FFFFFFFh	X	00000000h		00000068h			00000000h		
#!main_dataflow:comb_4 mux2x32:mux3 out[310]	0000d000h	0000000Fh	0000006Fh	00000002h	7FFFFFFh	80000001h	00000098h	0000000Ch	00000068h	00000000h	00000068h	00000000h	0000000	Ch 00000088
± main_dataflow:comb_4 mux4x32:mux4 a0[310]	00000004h	00000078h	0000007Ch	00000080h	00000084h	00000088h	0000000Ch	00000010h	00000014h	00000018h	0000001Ch	0000006Ch 00000	0000004 X	14h X 00000048
main_dataflow:comb_4 mux4x32:mux4 a1[310]	00000078h	000000B4h	0001807Ch	000001A0h	000001B4h	00010108h	0001A00Ch	00000040h	00000094h	00000018h	0000003Ch	0000006Ch 00000	0001C04	14h 00000058
± main_dataflow:comb_4 mux4x32:mux4 a2[310]	000000001		00000060h	00000	0000h	00000002h	00000000h	0000	000Ch	00000000h	00000068h	00000	0000h	00000084
⊞ main_dataflow:comb_4 mux4x32:mux4 a3[310]	00000074h	0020003Ch	02218000h	(00200120h	00240130h	04250080h	0069A000h	0D6C0030h	ODEC0080h	00000000h	0D800020h	00000000h X 00000	0069C00	IOh X 0D680010
main_dataflow:comb_4 mux4x32:mux4 y[310]	00000074h	00000078h	0000007Ch	00000080h	00000084h	00000088h	0000000Ch	00000010h	00000014h	00000018h	00000068h	0000006Ch 00000	0000004	14h X 00000048
± main_dataflow:comb_4 mux2x32:mux5 in0[310]	00000000h	X 0000000Fh	X 0000006Fh	X 00000002h	7FFFFFFFh	X 80000001h	00000	nnch	00000068h	(00000000h)	00000068h	00000000h	X 0000000	4h X 00000088

							dick to inse	rt time bar						
15 1	6 17	1 1	8 1	9 2	0 2	21 2	2 2	3 2	4 2	5 2	6 2	7 2	8 29	30 31
00000048h	0000004Ch	00000088h	0000008Ch	00000008h	0000000Ch	00000010h	00000014h	00000018h	0000003Ch	00000040h	00000044h	00000048h	0000004Ch 00000090h	( 00000094h
409A7000h	42000018h	00000000h	0000000Ch	401A6800h	335B000Ch	8F7B0020h	00000000h	03600008h	00000000h	401A7000h	235A0004h	409A7000h	42000018h 00000000h	(0128001Ah)
00000060h	×	00000	0000h		0000	0004h	(00000000h)	0000003Ch	00000	0000h	0000008Ch	00000060h	00000000h	(7FFFFFFFh)
00000088h		00000000h		00000088h	0000000Ch	00000020h		00000000h		0000	0004h	00000090h	00000000h	(80000001h)
000000E8h	(	00000000h		00000088h	00000004h	00000024h	00000000h	0000003Ch	00000000h	00000004h	00000090h	000000F0h	000000001	
0Eh	X	00h		( ODh			00h			0Eh	00h	0Eh	00h	
1Ah	(	00h		(1Ah	1	Bh		00h			1Ah		00h	( 08h
0Eh	X	00h		(1Ah	( 1	Bh		00h		1	Ah	0Eh	00h	
00000060h	(	0000	0000h		0000	0004h	(00000000h)	0000003Ch	00000	0000h	0000008Ch	00000060h	00000000h	(7FFFFFFFh)
							00000	0000h						
00000060h	X	0000	0000h		0000	0004h	00000000h	0000003Ch	00000	0000h	0000008Ch	00000060h	00000000h	(7FFFFFFFh)
00000088h	(	00000000h		00000088h	00000068h	00000004h		00000000h		00000004h	0000008Ch	00000090h	00000000h	80000001h
00007000h	00000018h	00000000h	0000000Ch	00006800h	0000000Ch	00000020h	00000000h	00000008h	00000000h	00007000h	00000004h	00007000h	00000018h 00000000h	(0000001Ah)
00000088h	×	00000000h		00000088h	0000000Ch	00000020h		00000000h		0000	0004h	00000090h	00000000h	X 80000001h
000000E8h		00000000h		00000088h	00000004h	00000024h	00000000h	0000003Ch	00000000h	00000004h	00000090h	000000F0h	100000000	
		00000	0000h			0000003Ch					00000000h			
000000E8h	X	00000000h		00000088h	00000004h	0000003Ch	(00000000h)	0000003Ch	00000000h	00000004h	00000090h	000000F0h	100000000	
0000004Ch	00000050h	0000008Ch	00000090h	0000000Ch	00000010h	00000014h	00000018h	0000001Ch	00000040h	00000044h	00000048h	0000004Ch	00000050h 00000094h	( 00000098h
0001C04Ch	000000B0h	0000008Ch	000000C0h	0001A00Ch	00000040h	00000094h	00000018h	0000003Ch	00000040h	0001C044h	00000058h	0001C04Ch	000000B0h 00000094h	00000100h
00000060h	X	0000	0000h		0000	0004h	00000000h	0000003Ch	00000	0000h	0000008Ch	00000060h	00000000h	7FFFFFFFh
0269C000h	08000060h	00000000h	00000030h	0069A000h	0D6C0030h	ODEC0080h	00000000h	0D800020h	00000000h	0069C000h	0D680010h	0269C000h	08000060h 00000000h	04A00068h
0000004Ch	( 00000050h )	0000008Ch	00000090h	0000000Ch	00000010h	00000014h	00000018h	0000003Ch	00000040h	00000044h	00000048h	0000004Ch	00000050h 00000094h	( 00000098h
000000E8h	X	00000000h		00000	0004h	0000003Ch	00000000h	0000003Ch	00000000h	0000008Ch	00000090h	000000F0h	100000000	

31 32	33	34 3	5 36	37	38	39 4	10 4	41 42	4	3 4	4 45	46	47
	· ·			0000054h X 00000058h								000000A4b Y	000000A8h
401A6800h 33	5B000Ch X 8F7B0020	h 00000000h	03600008h 0	0000000h X 08000010h		235A0004h	409A7000h			34040050h			8C890000h
00000000h X 00000090h X 000	00000008h 00000Ch X 00000020		00000054h X	00000000h 0h	00000008h	X 00000094h X 00000004h	X 00000060h X 00000098h	X	00h	00000000h	00000004h X	00000	00000050h
	000008h X 00000028			00000000h		00000098h		000000	=		00000004h	00000000h X	00000050h
ODh X		0(	lh .		0Eh	( 00h	( OEh	X	0	)h	X	08h X	00h
1Ah X	1Bh 1Bh	X	00h		X	1Ah Ah	X 0Eh	X 00h		04h	05h X	00h X	09h 09h
00000000h	00000008h	X 00000000h		00000000h	^	X 00000094h		X		00000000h	<u> </u>		00000050h
( 00000000h X	00000008h	X 00000000h	00000054h X	00000000h 00000000h		X 00000094h	X 00000060h	У		00000001h 00000000h		00000000h	00000050h
	00003Ch X 00000008	h X	0000000	0h		00000094h	00000098h	000000		00000060h	000000		7FFFFFFFh
	00000Ch X 00000020 00000Ch X 00000020		00000008h_X_0	0000000h X 00000010h Dh		X 00000004h	00007000h	X 00000018h X 000000		00000050h X	00000004h X	00004020h X	
00000090h X 00	000008h X 00000028	h X 00000000h		00000000h	00000008h	00000098h	000000F8h	000000	00h	00000050h	00000004h X		00000050h
00000090h X 00	000008h X 00000054	h X 00000000h	00000054h			X 00000098h	000000F8h			00000050h	00000004h X	00000000h X	000000A3h
				0000058h X 0000005Ch 0000058h X 0000009Ch		*							
00000000h	00000008h	00000000h	00000054h	00000000h		00000094h	00000060h	X		00000000h		X	00000050h
	000010h X 00000014			0000000h X 00000040h 0000058h X 00000040h				00000050h			00140010h (		
00000008	h X 00000054	h 00000000h	00000054h	00000000h	00000094h	00000098h	000000F8h	000000	00h	00000050h	00000004h	00000000h X	000000A3h
47 48	49	50 5	1 52	53	4	55 :	56 5	57 58	5	9 6	0 61	67	2 63
				00000ACh X 000000B0h									
	094020h X 20A5FFFF		8C890000h 2	0840004h X 01094020h 4h X 000000A3h		14A0FFFBh 00000002h				20A5FFFFh 00000002h		8C890000h X	
00000004h X 000	0000A3h X FFFFFFF	h X 00000	000h X 0	0000004h X 00000027h	FFFFFFFh	0000	10000h	X 00000004h X	00000079h	FFFFFFFh	00000	)00h X	00000004h
( 00000054h X 000	0000A3h X 00	000003h	00000054h X 0	0000058h X 000000CAh	X <u>0000</u>	00002h	X 00000058h	X 0000005Ch X	00000143h	00000	0001h X	0000005Ch_X	00000060h
00h X	08h X	1Fh	00h	08h		IFh		Oh X	08h	=	Fh X	00 00b	,
04h X	09h X 05h 08h X 05h	X 00h )	09h X	04h X 09h 04h X 08h	05h	X 00h	X 09h X 09h	X 04h X 04h X	09h 08h	05h 05h	1Fh X	09h X	04h 04h
00000050h 000	000000h X 00000004	00000003h 00001Fh	0000005	4h 000000A3h 0000000h		00000002h	X 0000	00000000h	000000CAh	00000002h		00000	
00000050h X 000	000000h X 00000004	h X 00000003h	0000005	4h X 000000A3h	00000003h	X 00000002h		0058h		00000002h	00000001h	00000	05Ch
				0000054h X 00000027h 0000004h X 00004020h									
00000004h 000	0000A3h X FFFFFFFF	h X 00000	000h X 0	0000004h X 00000027h	FFFFFFF	X 0000	10000h	00000004h	00000079h	(FFFFFFFFh)	00000	)00h X	00000004h
00000054h X 000 00000027h X 000				0000058h X 000000CAh 0000079h X 00000002h		00002h 00000h		X 0000005Ch X X 00000115h X	00000143h	00000000h		0000005Ch X 00000115h X	
00000054h 000				0000058h X 000000CAh		00002h		0000005Ch				00000115h X	
				00000C0h X 00010134h									
	000000h X 00000004 250080h X 0297FFFC	===	0000005 02240000h X 0	4h X 000000A3h 2100010h X 04250080h		X 00000002h X 0283FFECh		0058h X		00000002h 0297FFFCh		00000 02240000h X	
				00000B0h X 000000B4h									
( 00000054h X 000		000003h		0000058h X 000000CAh		00002h		X 0000005Ch X				00000115h X	•
63 6	64 6	5	66	67 6	i8 I	69 '	70 		71 	72 	73 1		74
00000080h	X 000000B4h >	000000B8h	Y 000000B	Ch X							00000	OCOh	
01094020h	20A5FFFFh										08000		
00000143h	( 00000001h									00000000	)h		
00000115h	(FFFFFFFh									00000000	)h		
00000258h	X								00000	000h			
/ 001	J v	-											
( 08h	X 1F X 05h	<u>n</u>								00h	00h		
08h	X 05h	1Fh	χ							0011	00h		
00000143h	X 00000001h									00000000			
00000000h	00000	001Fh	X								0000000h		
00000143h	00000001h									00000000	)h		
00000115h	00000001h									00000000			
00004020h	X FFFFFFFFh X	FFFFFFBh	X 0000000	Oh_X							00000	030h	
00000115h	X FFFFFFFh >								00000	00000000	)n		
00000258h	^								00000				
00000079h	χ̈́								00000				
000000B4h	000000B8h	000000BCh	X 000000C	Dh X							00000	0C4h	
00010134h	000000B4h	000000A8h	X 000000C	Dh X							00000	184h	
00000143h	00000001h									00000000	)h		
04250080h	0297FFFCh			Dh X							00000	0C0h	
000000B4h	X 000000B8h >	000000BCh	Χ								00000C0h		
( 00000258h	۸								00000	UUUh			
= /4 ===													

最终死循环在 finish

# 2. 不带异常和中断的 sinaltap 仿真结果

	1.	^	4 2	1	-		0	7	0 0	40		42	42	
Name set	j-1	<u> </u>	1 1	1	- 7	٦	Ď,	1	5 9	10	ų.	12	13	14
main_dataflow:comb_4 pc[310]		00000000h	00000004h	00000008h X 000	0000Ch 000	00000h X 000000	064h X 00000068	h ( 0000006Ch	( 00000070h )	00000074h	00000064h X 000	00068h X 0000	000000	70h X 00000
main_dataflow:comb_4 inst[310		3C01Q000h	34240050h	20050004h X 0C0	00018h 000	04020h X 8C890	000h X 20840004				8C890000h X 208			FFh X 14A0F
main_dataflow:comb_4 alu:alu0 a		00000000	00000	000h	000105	000000000	00000050h	00000000h	00000004h X		00000054h		00000h 000000	
- main_dataflow:comb_4 alu:alu0 b - main_dataflow:comb_4 alu:alu0 r		000000000h		00000004h 000 00000004h 000		00000000h 00000h X 000000			X FFFFFFFF X 000000		00000054h X 000		0000h X FFFFFF	00000000000000000000000000000000000000
ain_dataflow:comb_4 alu:alu0 z	[010]		7	( 0000000 111 )( 000	0001011 )( 000		V 2000000		î	<u> </u>		- COUNTY   COUNTY		COCCOCCEN
taflow:comb_4 mux2x5:mux0 ii	n0[40]		00h			08h	00h	( 08h	X 1FI	h X	00h		Bh X	1Fh
taflow:comb_4 mux2x5:mux0 ii		01h	( 04h )	05h	00h	( 091	h ( 04h	( 09h	( 05h )	00h	09h X	04h X 0	9h (05h	X 00
taflow:comb_4 mux2x5:mux0 c		01h	( <u>04h</u> )	(05hX	00h	08h 09i	h X 04h	08h	05h	00h	09h X	04h 0		X 00
flow:comb_4 mux2x32:mux1 in			00000	000h		X	00000050h	X 00000000h	X 00000004h X	00000003h X	00000054h	X 0000	0000h X 000000	03h X 00000
flow:comb_4 mux2x32:mux1 in		0000Q000h	00000001h			00000000h	000000000	V	X 000000	01Fh X	000	00000h	X	0000001Fh
flow:comb_4 mux2x32:mux1 o flow:comb_4 mux2x32:mux2 in		00000000h	X 00000060h X	FEEEEEEF V	00000000h	V EEEEE	FFFh X 00000050	h X 00000000h	X 00000004h X X 00000004h X	00000003h /	10h V 000	00054h X 0000	00000 V 000000	03h X 0000L
flow:comb_4/mux2x32:mux2/in		0000Q000h	00000050h			04020h X 000000				FFFFFFBh		00004h X 0000	4020h X FFFFFF	FFh Y FFFFF
flow:comb 4 mux2x32:mux2 o		0000d000h	X 00000050h X			00000000h		h X 00000000h		000000	00h X 000	00004h X 0000	0000h X FFFFFF	FFh X 0000
flow:comb_4 mux2x32:mux3 in	0[310]	000000000	00000050h	00000004h X 000	00018h 000	00000н 🗶 00000	050h X 00000054	h X 00000000h	00000	003h	00000054h X 000	00058h 0000	0000h	00000002h
flow:comb_4 mux2x32:mux3 in							0	0000000h						
flow:comb_4 mux2x32:mux3 o		00000000h	( 00000050h )		000	00000h	00000054		( 00000003h )	000000		00058h X 0000	00000h X 000000	02h X 00001
flow:comb_4 mux4x32:mux4 a		00000004h	00000008h			00064h X 000001	068h X 00000060	h X 00000070h	X 00000074h X	00000078h X	00000068h X 000	0006Ch X 0000	0070h X 000000	74h X 00000
flow:comb_4 mux4x32:mux4 a flow:comb_4 mux4x32:mux4 a		00000004h	X 00000148h X		00070h X 000	100E4h X 000000	00000050h	(h ( 000100F0h ( 0000000h	X 00000070h X X 00000004h X	00000064h X	00000068h X 000	0007Ch X 0001 X 0000	000000 X 000000	70h X 00000
flow:comb_4 mux4x32:mux4 a.		00040000h		00140010h X 000	00060b V 000	10080h X 02240i	00000050N 000h X 02100010		X 0297FFFCh X			00010h X 0425	00000 X 000000	ECh Y 0283E
taflow:comb_4 mux4x32:mux4		0000Q004h		0000000Ch X 000									0070h X 000000	74h X 00000
flow:comb_4 mux2x32:mux5 in		0000d000h	00000050h	00000004h	000	00000h	00000054	h X 00000000h	00000003h	0000000	00h X 000	00058h 0000	00000h X 000000	02h X 00001
16	17	18 19	9 2	20 21	2	2 2	23 2	24 2	5	26	27	28	29	30
00000064h X 00000068h														h X 00000
3C890000h 20840004h	01094020h	20A5FFFFh	14A0FFFBh	8C890000h X	20840004h	01094020h	20A5FFFFh	14A0FFFBh	00081000h	X 03E00008h	AC820000h	X 8C890000H	01244022	h 20050
00000058h	00000000h	00000002h	00000001h	000000	5Ch	00000000h	00000001h	00000	0000h	00000010h	000	00060h	X 00	1000000h
00000000h 00000004h	00000000h	(FFFFFFFFh)	0000	00000h	00000004h	00000000h	FFFFFFFh	X		00000000h			00000060	h X 00000
00000058h 0000005Ch	00000000h	00000	1001h	0000005Ch X	00000060h	X	0000	0000h		X 00000010h	000	00060h	(FFFFFFA0	h X 00000
								_	_					
00h	08h	X 1F	h	X 00h		08h	X1	Fh	02h	Х	00h		( 08h	X 00
09h X 04h	09h	(05h)	00h	X 09h X	04h	09h	( 05h	( 00h	08h	00h	( 02h	( 09h	( 04h	X 05
09h X 04h	( 08h	( 05h )	00h	( 09h )	04h	08h	( 05h	00h	02h	X 00h	( 02h	X 09h	( 08h	X 05
00000058h	^	X 00000002h X		X 000000			X 00000001h	X 00000		X 00000010h		00060h		1000000h
00000000h	,	X 000000		χ	00000000h		^	001Fh				00000h	, 00	
0000000011	Y 00000000	X 00000002h X		X 000000		00000000h	X 00000001h	X 0000	0000h	X 00000010h		00060h	Υ	1000000h
00000058h	X 00000000h	X 00000002h X			0000005Ch	X 00000000h	^	Y 00000		000000000			X 00000060	
00000000h X 00000004h	^							\\			V	000001	X 00004022	
				X 00000000h X				/ FFFFFFBN		X 00000008h	A 000	00000h		
0000000h X 00000004h	^					X_00000000h		λ		00000000h				h X 00000
00000058h X 0000005Ch	00000000h	X 00000	1001h	X 0000005Ch X	00000060h	Χ		0000h		X 00000010h	χ 000	00060h	₹ FFFFFFA0	h X 00000
	V	V				0000	10000h			V				
00000000h X 0000005Ch					00000060h	X		0000h		X 00000010h		00000h	X FFFFFFA0	
00000068h X 0000006Ch	X 00000070h	X 00000074h X	00000078h	X_00000068h_X_	0000006Ch	X 00000070h	X_00000074h	(_00000078h_)	0000007Ch	X 00000080h	X 00000014h	X 00000018h	X 0000001C	h_X_00000
00000068h 0000007Ch	X 000100F0h	X 00000070h	00000064h	X 00000068h X	0000007Ch	000100F0h		00000064h	0000407Ch	X 000000A0h		000000181	X 000100A4	h X 00000
00000058h	00000000h	X 00000002h X	00000001h	000000	5Ch	00000000h	00000001h	00000	0000h	X 00000010h	X 000	00060h	X 00	1000000h
02240000h 02100010h	04250080h	0297FFFCh	0283FFECh	02240000h X	02100010h	04250080h	0297FFFCh	0283FFECh	00204000h	√ 0F800020h	02080000h	022400001	04910088	h 00140
00000068h 0000006Ch	00000070h	00000074h	00000064h	00000068h	0000006Ch	00000070h	00000074h	00000078h	0000007Ch	00000010h	00000014h	00000018	0000001C	h X 00000
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00000020h X 00000024h								0 4 00000044h		42 X 00000024h	X 00000028h	X 0000002CH	X 00000030I	1 X 000000
20A5FFFFh 34A8FFFFh	39085555h	2009FFFFh	312AFFFFh	01493025h			10A00001h	00000044h X	00000020h 20A5FFFFh	X 00000024h X 34A8FFFFh	X 00000028h X 39085555h X 0000FFFFh	2009FFFFh	312AFFFF	h X 014930
0A5FFFFh X 34A8FFFFh 00000003h X 00000002h	39085555h	2009FFFFh X 00000000h X	312AFFFFh )	01493025h X	01494026h		10A00001h	00000044h X	00000020h 20A5FFFFh	X 00000024h X 34A8FFFFh	X 39085555h X 0000FFFFh	2009FFFFh	X 312AFFFF X FFFFFFFF	h X 014930
20A5FFFFh	39085555h 0000FFFFh	2009FFFFh X 00000000h X FFFFFFFFh X	312AFFFFh )	01493025h X	01494026h 0000FFFFh		10A00001h 00000002h	00000044h ) 08000008h ) 00000000h )	00000020h 20A5FFFFh 00000002h	X 00000024h X 34A8FFFFh X 00000001h X 0000FFFFh	X 39085555h X 0000FFFFh	2009FFFFh 00000000h	X 312AFFFF X FFFFFFFFF X 0000FFFFF	h X 014930 1 X 0000F 1 X FFFFF
0A5FFFFh	39085555h 0000FFFFh 00005555h	2009FFFFh X 00000000h X FFFFFFFFh X	312AFFFFh FFFFFFFFh 0000FFFFh	01493025h X	01494026h 0000FFFFh FFFFFFFFh	01463824h	10A00001h 00000002h 00000000h	00000044h ) 08000008h ) 00000000h )	00000020h 20A5FFFFh 00000002h FFFFFFFFh	X 00000024h X 34A8FFFFh X 00000001h X 0000FFFFh	X 39085555h X 0000FFFFh X 00005555h	2009FFFFh  000000000h  FFFFFFFFh	X 312AFFFF X FFFFFFFFF X 0000FFFFF	h X 014930 1 X 0000F 1 X FFFFF
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0A5FFFFh	39085555h 0000FFFFh 00005555h 0000AAAAh	2009FFFFh   X   00000000h   X   FFFFFFFFh   X   X   FFFFFFFFh   X   X   FFFFFFFFh   X   X   FFFFFFFFh   X   X   FFFFFFFFFh   X   X   FFFFFFFFFF	312AFFFFh ) FFFFFFFFh ) 0000FFFFh )	01493025h X	01494026h ) 0000FFFFh FFFFFFFF FFFF0000h )	01463824h 0000FFFFh	10A00001h 00000002h 00000000h 00000002h	( 00000044h ) ( 08000008h ) ( 00000000h ) ( 00000008h ) ( 00000008h )	0000020h 20A5FFFFh 0000002h FFFFFFFFh 00000001h	X 00000024h X 34A8FFFFh X 00000001h X 0000FFFFh X 0000FFFFh	X 39085555h X 0000FFFh X 00005555h X 0000AAAAh X 0Ah	2009FFFFh 200000000h FFFFFFFFh X FFFFFFFFh	X 312AFFFF X FFFFFFFF X 0000FFFFI X 0000FFFFI	h X 014930 h X 0000F h X FFFFF h X FFFFFF
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0ASFFFFN	39085555h 0000FFFh 00005555h 0000AAAAh 0Ah 8h 0000FFFh 0000015h 0000FFFh	2009FFFFh X 00000000h X FFFFFFFFh X 1FFFFFFFh X 199h X 0000000h X 00000000	312AFFFFh  FFFFFFFFh  0000FFFFh  0000FFFFh  0Ah  0A	06h X 09h	01494028h 0000FFFFh FFFFFFFFh FFFFFFFFh 0000FFFFh 0000FFFFh FFFFFFFF	01463824h  0000FFFFh  07h  06h  07h  00000000h	10A00001h 0000002h 00000000h 00000002h 00000002h 00000002h 00000002h	0000004h 0000000h 0000000h 0000000h 0000000h 000000	00000020h 20A5FFFFh 0000002h FFFFFFFF 00000001h 05h 05h 05h 0000002h 0000002h	X 00000024h X 34A8FFFF X 00000001h X 0000FFFFh X 0000FFFFh X 00000001h X 00000001h X 00000001h X FFFF0000h	X 39085555h	X 2009FFFFh X 00000000h X FFFFFFFFh X FFFFFFFh X 09h X 09h X 00000000h X 00000000h X 00000000h	312AFFFFF  FFFFFFFF  0000FFFFI  1Fh  0Ah  FFFFFFFFF  00001Fh  FFFFFFFFF  0000FFFFF	h X 014934 h X 0000F h X FFFFF X 068 X 099 X 068 h X 0000F X 00000 h X 0000F
DASFFFFN 34A8FFFFN 0000003h 000002ch 000002ch 1Fh 05h 0000002h 0000002h 00000002h 00000003h 00000002h 00000002h 00000003h 000000003h 000000002h FFFFFFFN FFFFFFFFN 0000FFFFN	39085555h 0000FFFh 00005555h 0000AAAAh 0Ah 8h 0000FFFh 0000015h 0000FFFh	2009FFFFh X 00000000h X FFFFFFFFh X 1FFFFFFFh X 199h X 0000000h X 00000000	312AFFFFh  FFFFFFFFh  0000FFFFh  0000FFFFh  0Ah  0A	06h X 09h 0003025h 00003025h	01494028h 0000FFFFh FFFFFFFFh FFFFFFFFh 0000FFFFh 0000FFFFh FFFFFFFF	01463824h  0000FFFFh  07h  06h  07h  00000000h	10A00001h	00000044h ) 0800008h ) 0000008h ) 0000008h ) 0000008h ) 0h ) 0h ) 0h ) 0h ) 00000000h ) 00000000h )	00000020h 20A5FFFFh 0000002h FFFFFFFF 00000001h 05h 05h 05h 0000002h 0000002h	X 00000024h X 34A8FFFF X 00000001h X 0000FFFFh X 0000FFFFh X 00000001h X 00000001h X 00000001h X FFFF0000h	X 39085555h X 0000FFFFh X 00005555h X 0000AAAAh X 0Ah 08h X 0000FFFh X 0000FFFFh X 0000FFFFh X 0000FFFFh X 0000FFFFh X 00005555h	X 2009FFFFh X 00000000h X FFFFFFFFh X FFFFFFFh X 09h X 09h X 00000000h X 00000000h X FFFFFFFFFh	312AFFFFF  FFFFFFFFF  0000FFFFI  1Fh  0Ah  1FFFFFFFFF  00001Fh  FFFFFFFFF  0000FFFFF	h X 014930 h X 0000F h X FFFFF h X FFFFF X 060 X 090 X 0000 h X 0000F X 0000F h X 0000F h X 0000F h X 0000F
DAGFFFFN         34A8FFFN           0000003h         0000002h           PFFFFFFFN         00000FFFN           0000002h         0000FFFN           1Fh         0           95h         0           000         0           000         0           000         0           000         0           000         0           000         0           0	39085555h 0000FFFFh 00005555h 0000AAAAh (	2009FFFFh	312AFFFFh  FFFFFFFFh  0000FFFFh  0000FFFFh  0Ah  0A	06h (00003025h )	01494026h 0000FFFFh FFFFFFFFF FFFFFFFF 0000FFFFh 0000FFFFh 0000FFFFh 00004026h	01463824h  0000FFFFh  07h  06h  07h  00000000h	10A00001h	0000000h	0000020h  20A5FFFFh  0000002h  FFFFFFFFh  00000001h  1  05h  05h  0000002h  0000002h  0000002h  FFFFFFFFFF	\$\times 00000024h \$\times 34A8FFFFh \$\times 0000001h \$\times 0000FFFh \$\times 0000FFFh \$\times 0000001h \$\times 00000001h \$\times 0000001h \$\times 00000001h \$\times 0000001h \$\times 00000001h \$\times 0000001h \$\times 00000001h \$\times 0000001h \$\times 00000001h \$\times 00000001h \$\times 00000001h \$\times 0000001h \$\times 00000001h \$\times 00000001h \$\times 00000001h \$\times 0000001h \$\times 00000001h \$\times 00000001h \$\times 000000001h \$\times 0000001h \$\times 0000001h \$\times 00000001h \$\times 00000001h \$\times 0000001h \$\times 00000001h \$\times 00000001h \$\times 00000001h \$\times 00000001h \$\times 00000001h \$\times 00000001h \$\times 0000001h \$\times 00000001h \$\times 0000001h \$\times 0000001	X 39085555h X 0000FFFFh X 00005555h X 0000AAAAh X 0Ah 08h X 0000FFFFh X 0000015h X 0000FFFFh X 00005555h X 00005555h X 00005555h	X 2009FFFFF X 00000000 X FFFFFFFFF X 09h X 09h X 00000000 X 000 X	312AFFFFF	h X 014930 h X 0000F h X FFFFF h X FFFFFF X 060 X 090 X 0000 h X 0000F h X 0000F
DAGFFFFN         34A8FFFN           0000003h         0000002h           PFFFFFFFN         00000FFFN           0000002h         0000FFFN           1Fh         0           95h         0           000         0           000         0           000         0           000         0           000         0           000         0           0	39085555h 0000FFFFh 00005555h 0000AAAAh (	2009FFFFh	312AFFFFh  FFFFFFFFh  0000FFFFh  0000FFFFh  0Ah  0A	06h (00003025h )	01494026h 0000FFFFh FFFFFFFFF FFFFFFFF 0000FFFFh 0000FFFFh 0000FFFFh 00004026h	01463824h  0000FFFFh  07h  06h  07h  00000000h	10A00001h	0000000h	0000020h  20A5FFFFh  0000002h  FFFFFFFFh  00000001h  1  05h  05h  0000002h  0000002h  0000002h  FFFFFFFFFF	\$\times 00000024h \$\times 34A8FFFFh \$\times 0000001h \$\times 0000FFFh \$\times 0000FFFh \$\times 0000001h \$\times 00000001h \$\times 0000001h \$\times 00000001h \$\times 0000001h \$\times 00000001h \$\times 0000001h \$\times 00000001h \$\times 0000001h \$\times 00000001h \$\times 00000001h \$\times 00000001h \$\times 0000001h \$\times 00000001h \$\times 00000001h \$\times 00000001h \$\times 0000001h \$\times 00000001h \$\times 00000001h \$\times 000000001h \$\times 0000001h \$\times 0000001h \$\times 00000001h \$\times 00000001h \$\times 0000001h \$\times 00000001h \$\times 00000001h \$\times 00000001h \$\times 00000001h \$\times 00000001h \$\times 00000001h \$\times 0000001h \$\times 00000001h \$\times 0000001h \$\times 0000001	X 39085555h X 0000FFFFh X 00005555h X 0000AAAAh X 0Ah 08h X 0000FFFFh X 0000015h X 0000FFFFh X 00005555h X 00005555h X 00005555h	X 2009FFFFF X 00000000 X FFFFFFFFF X 09h X 09h X 00000000 X 000 X	312AFFFFF	h X 014930 h X 0000F h X FFFFF h X FFFFFF X 060 X 090 X 0000 h X 0000F h X 0000F
0ASFFFFN 34ASFFFFN 0000003h 0000002h 0000002h 00000FFFn 1Fh	39085555h  0000FFFFh  00005555h  (0000AAAAh  8h  0000FFFFh  0000015h  0000FFFFh  0000FFFFh  0000FFFFh  00005555h  (0000AAAAAh	2009FFFFh	312AFFFPh 0000FFFPh 0000FFFPh 0Ah 0Ah 0Ah FFFFFFFPh 0101Fh 0000FFFPh 0000FFFPh 0000FFFPh 0000FFFPh	01493025h	01494026h   0000FFFFh   FFFFFFFFF   08h   08h   0000FFFFh   0000FFFFh   0000FFFFh   00004026h   FFFFFFFFFF   00004026h   00000000000000000000000000000000000	01463824h	10A00001h 0000002h 00000002h 00000000000000	0000004h 08000008h 00000008h 00000008h 00000008h 00000008h 00000008h 00000000	0000002h  20ASFFFFH  00000002h  FFFFFFFFH  00000001h  1  05h  05h  0000002h  0000002h  FFFFFFFFH  00000001h	\$\text{ 00000024h}\$\$\times \text{ 00000024h}\$\$\times \text{ 34A8FFFh}\$\$\times \text{ 00000001h}\$\$\$\times \text{ 0000FFFh}\$\$\times \text{ 0000FFFh}\$\$\$\times \text{ 0000001h}\$\$\$\text{ 00000001h}\$\$\$\text{ 600000001h}\$\$\$\text{ 60000001h}\$\$\$\text{ 0000FFFh}\$\$\$\text{ 0000FFFh}\$\$\$\$\text{ 0000FFFh}\$\$\$\$\text{ 0000FFFFh}\$\$\$\$\$\text{ 0000FFFFh}\$\$\$\$\$\$\$\$\$\$\$\$\$\$000FFFFh\$\$\$\$\$\$\$\$\$\$	39085555h 0000FFFFh 0000555h 0000555h 0000555h 0000FFFh 0000015h 0000FFFFh 00000FFFh 0000FFFh 0000FFFh 00005555h 00005555h	2009FFFFH 20000000h 2 FFFFFFFFH 3	312AFFFFF  FFFFFFFF  0000FFFF  1Fh  0Ah  0Ah  VAN  0000FFFF  0000FFFF  0000FFFF  0000FFFF  0000FFFF  0000FFFFF	h \ 014934 h \ 0000F h \ 7 FFFFF h \ 7 FFFFF h \ 0000F h \ 00
0ASFFFFN	39085555h  0000FFFFh  0000AAAAh  0000FFFFh  0000015h  0000FFFFh  0000FFFFh  00005555h  00005555h  00005555h	2009FFFF	312AFFFFh FFFFFFFF	01493025h \	01494026h 0000FFFFh FFFFFFFFF 08h 08h 0000FFFFh 0000FFFFh 00004028h FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	01463824h  0000FFFFh  07h  06h  07h  00000000h  000003824h  0000FFFFh  00000  0000FFFFFh	10A00001h	0000004h 0000006h 0000006h 0000006h 0000006h 0000006h 0000006h 00000006h 00000006h 00000006h 00000006h	00000020h  20ASFFFFH  0000002h  FFFFFFFFF  00000001h  1 0Sh  0Sh  00000002h  00000002h  00000002h  FFFFFFFFF  FFFFFFFFF  00000001h	, 0000024h  34A8FFFh  0000001h  0000FFFh  N  0000FFFh  N  0000001h  0000FFFh  0000FFFh  0000FFFh  0000FFFh  0000FFFh  0000FFFh  0000FFFh  0000FFFh  0000FFFh	39085555h  0000FFFFh  00005555h  0000AAAAh  00h  00h  00h	2009FFFFH	312AFFFFF  \$FFFFFFFFF  \$0000FFFFI  \$0000FFFI  \$0000FFI  \$0000FFFI	h \ 014934 h \ 0000F h \ 7 FFFFF h \ 7 FFFFF h \ 0000F h \ 0000FFFFF h \ 0000FFFFF h \ 0000FFFFF h \ 0000FFFFFF h \ 0000FFFFFF h \ 0000FFFFFFF
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0ASFFFFN         34ASFFFFN           0000003h         0000002h           FFFFFFFN         0000007FFN           0000002h         0000FFFN           0Sh         0           0Sh         0           0Sh         0           0Sh         0           0Sh         0           0Sh         0           0000003h         0000002h           0000003h         00000002h           0000003h         FFFFFFA0h           0FFFFFH         0000FFFh           0000002h         0000FFFh           0000002h         0000FFFh           0000002h         0000FFFh           0000002h         000007FFh           0000002h         000002h           000002h         000002h	39085555h	2009FFFF   20000000	312AFFFFh  FFFFFFFFh  0000FFFFh  0000FFFFh  0Ah  0A		01494026h 0000FFFFh FFFFFFFFFF 088h 0000FFFFh 0000FFFFh 0000FFFFh 00004028h FFFFFFFFFFFFFF	01463824h  0000FFFFh  07h  06h  07h  00000000h  00003824h  0000FFFFh  0000  0000FFFFh  000000000	10A00001h 0000002h 00000002h 000000002h 00000002h 00000002h 00000002h 00000000	0000004h 0000006h 0000006h 0000006h 0000006h 0000006h 0000006h 00000006h 00000006h 00000006h 00000006h 00000006h 00000006h	0000020h  20ASFFFFh  0000002h  FFFFFFFFh  0000001h  1  05h  0000002h  0000002h  FFFFFFFFh  00000001h  00000001h  00000001h	, 0000024h	39085556h   39007FFFh   39085556h   30007FFFh   30005556h   30000556h   300007FFFh   300007FFFh   300007FFFh   300007FFFh   300007FFFh   300005556h   300005556h   300005556h   300000000000000000000000000000000000	\( \text{2009FFFF} \) \( \text{200900000} \) \( FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	312AFFFFF FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	N
DASFFFFN \ 34A8FFFFN \ 00000023h \ 000000022h \ 0000000022h \ 0000000000	39085656h  0000FFFFh  0000AAAAh  0Ah  8h  6000FFFFh  0000015h  0000FFFFh  00005556h  00005556h  0000AAAAh  0000AAAAh  0000AAAAh  0000AAAAh  0000AAAAh  0000AAAAh  0000AAAAh	2009FFFF.   00000000h   1	312AFFFFH FFFFFFFFF 0000FFFF 0000FFFF 0000FFFF 0Ah 0Ah 0Ah 0Ah 0TFFFFFFFF 0000FFFF 0000FFFFF 0000FFFF 0000FFF 0000FFFF 0000FFFF 0000FFFF 0000FFFF 0000FFFF 0000FFFF 0000FFFF 0000FFFF 0000FFF 0000FF 0000FFF 0000FFF 0000FFF 0000FFF 0000FF		01494026h 0000FFFFh 0000FFFFh 08h 08h 0000FFFh 00004028h FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	01463824h 0000FFFFh 07h 06h 07h 000000000 0000000000 0000000000	10A00001h 0000002h 0000002h 00000002h 0000000000	0000004h 0000000h 0000000h 0000000h 0000000h 000000	0000020h  20ASFFFFh  0000002h  FFFFFFFF  00000001h  1  05h  05h  0000002h  0000002h  00000001h  0000001h  0000001h	, 0000024h  \( \) 34A3FFFFh  \( \) 0000001h  \( \) 0000FFFh  \( \) 00000001h  \( \) 00000001h  \( \) 00000001h  \( \) 00000001h  \( \) 0000FFFh  \( \) 0000FFH  \( \) 0	39085556h   39000FFFh   39085556h   3000FFFh   30005556h   30000FFFh   30000FFFh   30000FFFh   30000FFFh   30000FFFh   300005556h   30000AAAAh   3000002Ch   30005556h   30000AAAAh   3000000Ch   3000FFFh   30005556h   30000AAAAh   300000Ch   3000FFFh   30005556h   30000AAAAh   30000AAAAh   30000AAAAh   30000AAAAh   30000AAAAh   30000FFFh   3000FFFh	2009FFFFH 200000000 2009FFFFFF 200000000 200000000 200000000 200000000	312AFFFFF FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	h \ 014936 h \ 014936 h \ 00000000000000000000000000000000000
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DACFFFFN         34A8FFFN           0000003h         0000002h           1FFFFFFFN         00000FFFN           0000002h         00000FFFN           0000002h         0000FFFN           05h         0           0000003h         0000002h           00000001h         0000002h           0000003h         0000002h           0000003h         FFFFFFAN           000007FFN         0000FFFN           0000002h         0000FFFN           0000002h         0000FFFN           0000002h         0000002h           0000002h         0000002h           0000002h         0000002h           0000002h         0000002h           0000002h         0000002h           0000002h         0000002h	39085555h  0000FFFPh  0000AAAAh  000095554h  000055554h  000055554h  000055554h  00006AAAAh  00009FFFPh  00009FFFPh	2009FFFP    20000000h	312AFFFFh PFFFFFFFFh 0000FFFh 0Ah 0Ah 0Ah 0TFF 01Fh 01Fh 0000FFFFh 0000FFFFh 0000FFFFh 0000FFFFh 0000FFFFh 0000FFFFh 000007FFFh 000007FFFh 000007FFFh 000007FFFh 000007FFFh 000007FFFh 000007FFFh 000007FFFh 000007FFFh 0000007FFFh 0000007FFFh 0000007FFFh 0000007FFFh 0000007FFFh 00000007FFFh 00000007FFFh 00000007FFFh 00000007FFFh 00000007FFFh 00000007FFFh 00000007FFFh 00000007FFFh 000000007FFF		01494026h 0000FFFFh FFFFFFFFh 0000FFFFh 0000FFFFh 0000FFFFh 00000000	00000FFFh 00000000000000000000000000000	10A00001h 0000002h 0000002h 00000002h 00000002h 00000002h 00000002h 00000002h 00000000	0000004h 0000006h 0000006h 0000006h 00000006h 00000006h 00000000	0000020h  20A5FFFFh  0000002h  FFFFFFFF h  0050001h  05h  0050002h  0000002h  FFFFFFFF h  0000001h  0000002h  0000002h  0000002h  0000002h  0000002h  0000002h	, 0000024h	39085555h 0000FFFh 0000FFFh 0000AAAAh 000h 0000CFFFh 00000FFFh 00000FFFh 00000FFFh 00000555h 0000AAAAh 0000002ch 0000555h 0000555h 0000AAAAh 0000002ch 0000555h 0000FFFh 0000555h 0000FFFh 0000555h	2009FFFFH 200000000h X FFFFFFFH X 20000000h X 09h X 09h X 09h X 00000000h X 00000000h X FFFFFFFFH X FFFFFFFFH X FFFFFFFFH X FFFFFFFF	312AFFFFF  FFFFFFFFFF  0000FFFF  0000FFF  0000FFFF  0000FFF  0000FFF	h \ 01493i h \ 01493i h \ 00000 h \ FFFFF h \ FFFFFI  \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
DACFFFFN         34A8FFFN           0000003h         0000002h           1FFFFFFFN         00000FFFN           0000002h         00000FFFN           0000002h         0000FFFN           05h         0           0000003h         0000002h           00000001h         0000002h           0000003h         0000002h           0000003h         FFFFFFAN           000007FFN         0000FFFN           0000002h         0000FFFN           0000002h         0000FFFN           0000002h         0000002h           0000002h         0000002h           0000002h         0000002h           0000002h         0000002h           0000002h         0000002h           0000002h         0000002h	39085555h  0000FFFPh  0000AAAAh  000095554h  000055554h  000055554h  000055554h  00006AAAAh  00009FFFPh  00009FFFPh	2009FFFP    20000000h	312AFFFFh PFFFFFFFFh 0000FFFh 0Ah 0Ah 0Ah 0TFF 01Fh 01Fh 0000FFFFh 0000FFFFh 0000FFFFh 0000FFFFh 0000FFFFh 0000FFFFh 000007FFFh 000007FFFh 000007FFFh 000007FFFh 000007FFFh 000007FFFh 000007FFFh 000007FFFh 000007FFFh 0000007FFFh 0000007FFFh 0000007FFFh 0000007FFFh 0000007FFFh 00000007FFFh 00000007FFFh 00000007FFFh 00000007FFFh 00000007FFFh 00000007FFFh 00000007FFFh 00000007FFFh 000000007FFF		01494026h 0000FFFFh FFFFFFFFh 0000FFFFh 0000FFFFh 0000FFFFh 00000000	00000FFFh 00000000000000000000000000000	10A00001h 0000002h 0000002h 00000002h 00000002h 00000002h 00000002h 00000002h 00000000	0000004h 0000006h 0000006h 0000006h 00000006h 00000006h 00000000	0000020h  20A5FFFFh  0000002h  FFFFFFFF h  0050001h  05h  0050002h  0000002h  FFFFFFFF h  0000001h  0000002h  0000002h  0000002h  0000002h  0000002h  0000002h	, 0000024h	39085555h 0000FFFh 0000FFFh 0000AAAAh 000h 0000CFFFh 00000FFFh 00000FFFh 00000FFFh 00000555h 0000AAAAh 0000002ch 0000555h 0000555h 0000AAAAh 0000002ch 0000555h 0000FFFh 0000555h 0000FFFh 0000555h	2009FFFFH 200000000h X FFFFFFFH X 20000000h X 09h X 09h X 09h X 00000000h X 00000000h X FFFFFFFFH X FFFFFFFFH X FFFFFFFFH X FFFFFFFF	312AFFFFF  FFFFFFFFFF  0000FFFF  0000FFF  0000FFFF  0000FFF  0000FFF	h \ 01493i h \ 01493i h \ 00000 h \ FFFFF h \ FFFFFI  \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
DACFFFFN         34A8FFFN           0000003h         0000002h           1FFFFFFFN         00000FFFN           0000002h         00000FFFN           0000002h         0000FFFN           05h         0           0000003h         0000002h           00000001h         0000002h           0000003h         0000002h           0000003h         FFFFFFAN           000007FFN         0000FFFN           0000002h         0000FFFN           0000002h         0000FFFN           0000002h         0000002h           0000002h         0000002h           0000002h         0000002h           0000002h         0000002h           0000002h         0000002h           0000002h         0000002h	39085555h  0000FFFPh  0000AAAAh  000095554h  000055554h  000055554h  000055554h  00006AAAAh  00009FFFPh  00009FFFPh	2009FFFP    20000000h	312AFFFFh PFFFFFFFFh 0000FFFh 0Ah 0Ah 0Ah 0TFF 01Fh 01Fh 0000FFFFh 0000FFFFh 0000FFFFh 0000FFFFh 0000FFFFh 0000FFFFh 000007FFFh 000007FFFh 000007FFFh 000007FFFh 000007FFFh 000007FFFh 000007FFFh 000007FFFh 000007FFFh 0000007FFFh 0000007FFFh 0000007FFFh 0000007FFFh 0000007FFFh 00000007FFFh 00000007FFFh 00000007FFFh 00000007FFFh 00000007FFFh 00000007FFFh 00000007FFFh 00000007FFFh 000000007FFF		01494026h 0000FFFFh FFFFFFFFh 0000FFFFh 0000FFFFh 0000FFFFh 00000000	00000FFFh 00000000000000000000000000000	10A00001h 0000002h 0000002h 00000002h 00000002h 00000002h 00000002h 00000002h 00000000	0000004h 0000006h 0000006h 0000006h 00000006h 00000006h 00000000	0000020h  20A5FFFFh  0000002h  FFFFFFFF h  0050001h  05h  0050002h  0000002h  FFFFFFFF h  0000001h  0000002h  0000002h  0000002h  0000002h  0000002h  0000002h	, 0000024h	39085555h 0000FFFh 0000FFFh 0000AAAAh 000h 0000CFFFh 00000FFFh 00000FFFh 00000FFFh 00000555h 0000AAAAh 0000002ch 0000555h 0000555h 0000AAAAh 0000002ch 0000555h 0000FFFh 0000555h 0000FFFh 0000555h	2009FFFFH 200000000h X FFFFFFFH X 20000000h X 09h X 09h X 09h X 00000000h X 00000000h X FFFFFFFFH X FFFFFFFFH X FFFFFFFFH X FFFFFFFF	312AFFFFF  FFFFFFFFFF  0000FFFF  0000FFF  0000FFFF  0000FFF  0000FFF	h \ 01493i h \ 01493i h \ 00000 h \ FFFFF h \ FFFFFI  \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
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DASFFFFN 34A8FFFFN 0000003h 0000002h 0000002h 0000002h 00000000000	39085555h 0000FFFFh 0006555h 00067FFh 0006555h 00067FFh 000067FFh 000067FFh 000067FFh 00006555h 00005555h 00005555h 000067FFh 000067FFh 0000002Ch 0000002Ch 0000002Ch	2009FFFP    20000000h	312AFFFFH FFFFFFFFFH 0000FFFFH 0 0Ah 0Ah 0Ah 0Ah FFFFFFFFH 0000FFFH 0000FFFH 0000FFFH 0000FFFH 000007FFH 0000FFFH 000007FFH		01494026h 0000FFFh FFFFFFFFFF FFFF000h 08h 08h 0000FFFh FFFFFFFFF 00004028h FFFFFF000h 000003Ch 00010FFFh 000003Ch 00500003Ch 005000003Ch	01463824h  0000FFFFh  07h  06h  07h  0000000000000000000000	10A00001h 0000002h 00000000h 00000000h 00000000h 00000000	0000004h 0000006h 0000006h 0000006h 00000006h 00000006h 00000000	0000020h  20A5FFFFh  00000002h  FFFFFFFFh  05h  05h  0000002h  0000002h  0000002h  0000002h  0000002h  0000002h  0000002h	, 0000024h	39085556h  0000FFFh  0000AAAAh  0000556h  00000FFFh  0000FFFh  0000FFFh  0000FFFh  00005556h  0000FFFh  00005556h  00005556h  00005556h  00005556h  00005556h  00005556h  00005556h  00005556h  00005656h  0000566h	2009FFFFH 200000000h X FFFFFFFH X 20000000h X 09h X 09h X 09h X 00000000h X 00000000h X FFFFFFFFH X FFFFFFFFH X FFFFFFFFH X FFFFFFFF	312AFFFFF  FFFFFFFFFF  0000FFFF  0000FFF  0000FFFF  0000FFF  0000FFF	h \ 01493i h \ 01493i h \ 00000 h \ FFFFF h \ FFFFFI  \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
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DASFFFF	39085555h 0000FFFFh 00005555h 000007FFFh 000005555h 00000004AAAh 0000002Ch 00015580h 0000002Ch 0001580h 0000002Ch	2009FFFF    000000000     000000000     00000000	312AFFFFH FFFFFFFFH 0000FFFFh 0 0Ah 0 Ah 0 Ah FFFFFFFFH 0000FFFH 0000FFFH 0000FFFFH 0000FFFFH 0000FFFFH 0000FFFFH 0000094H 0000094H 0000095H	06h	01494028h 0000FFFh FFFFFFFFFFF FFFFFFFF FFFFFFFF	01463824h  0000FFFFh  07h  06h  07h  00h  000000000  00000324h  0000FFFFh  0000000000  0518E090h  0000FFFFh  000000FFFh	10A00001h 10A00001h 100000002h 100000000h 100000000h 100000000h 100000000	0000004h 0000000h 0000000h 0000000h 0000000h 000000	0000020h  20A5FFFFh  00000002h  105h  05h  0000002h  0000002h  0000002h  0000002h  0000002h  0000002h  0000002h	, 0000024h	39085556h  0000FFFh  0000565h  00007FFh  0000565h  000007FFh  0000015h  0000FFFh  00005556h  0000556h  00005556h  00005556h  00005556h  00005556h  00005556h  0000556h  00005556h  00005556h  00005556h  00005556h	2009FFFFH 000000000 V PFFFFFFH V 000000000 V 00000000 V 000000000 V FFFFFFFH 000000000 V FFFFFFFFH 000000000 V 000000000 V FFFFFFFFH 0000000000 V 0000000000000000000000000	312AFFFF FFFFFFFF	00000 00000 00000 00000 00000 00000 0000
DASFFFF	39085555h  0000FFFFh  0000AAAAh  0Ah  8h  6h  0000FFFFh  00000FFFh  0000FFFh  0000AAAAh  00000AAAAh  0000AAAAh	2009FFFP.	312AFFFFH 7FFFFFFFFH 0000FFFFH 0AA 0AA 0AA 0AA 0FFFFFFFFF 0000FFFFH 0000FFFFH 0000FFFFH 0000FFFFH 0000FFFFH 0000FFFFH 0000FFFFH 0000FFFFH 00000FFFH 00000FFFH 00000FFFH 0000007FFFH 0000000000	06h	01494028h 0000FFFF FFFFFFFFF FFFFFFF 0000FFFF 0000FFFF 0000FFFF FFFFFF	01463824h  0000FFFFh  07h  06h  07h  00h  07h  00000000h  00003824h  00000FFFFh  00000040h  00000FFFFh  00000040h  0000FFFFh  00000040h  00000FFFFh	10A00001h	0000004h 0000000h 0000000h 0000000h 0000000h 000000	0000020h  20A5FFFFh  00000002h  105h  05h  0000002h  0000002h  0000002h  0000002h  0000002h  0000002h  0000002h	, 0000024h	39085555h 0000FFFh 00005AAAh 000h 00005AAAAh 0000FFFh 0000AAAh 00000AAAAh	2009FFFFH 000000000 V PFFFFFFH V 000000000 V 00000000 V 000000000 V FFFFFFFH 000000000 V FFFFFFFFH 000000000 V 000000000 V FFFFFFFFH 0000000000 V 0000000000000000000000000	312AFFFF FFFFFFFF	0693 0000 0000 0000 0000 0000 0000 0000
DASFFFFN \ 34A8FFFFN \ 0000003h \ 00000002h \ 00000002h \ 000000002h \ 00000002h \ 00000002h \ 00000002h \ 00000002h \ 0000000000	39085555h	2009FFFF    00000000h     FFFFFFF    0900000h     0900000h     0900000h     0000000h     0000000h     0000000h     0000000h     0000000h     0000000h     0000000h     0000000h     0000000h     00000000h	312AFFFFH PFFFFFFFH 0000FFFFH 0AAh 0Ah 0Ah 0Ah 0Ah 0FFFFFFFFH 0000FFFFH 0000FFF	01493025h	01494028h 0000FFFFh FFFFFFFFFFF FFFFFFFFF 0000h 08h 08h 0000FFFF 0000FFFF FFFFFFFF FFFFFFFF FFFFFF	01463824h  0000FFFFh  07h  06h  07h  000000000h  00003824h  000005FFFh  00000000h  00000000h  00000000h  000000	10A00001h	0000004h 0000000h 0000000h 0000000h 0000000h 000000	0000020h  20A5FFFFh  0000002h  FFFFFFFFh  0000001h  05h  05h  0000002h  0000002h  0000002h  0000002h  0000002h  0000002h  0000002h  0000002h	, 0000024h	39085555h 0000FFFh 00005AAAh 000h 00005AAAAh 0000FFFh 0000AAAh 00000AAAAh	2009FFFFF	312AFFFFF  7FFFFFFFF  0000FFF  0Ah  0Ah  7FFFFFFF  0000FFF	0693 0000 0000 0000 0000 0000 0000 0000
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00000031	39085555h	2009FFFF    00000000h     0000000h     FFFFFFF    0900000h     0000000h     00000000h     000000000h     000000000h	312AFFFFH FFFFFFFFH 0000FFFH 00Ah 0Ah 0Ah 0Ah FFFFFFFFH 0000FFFH 0000FFFH 0000FFFH 0000FFFH 0000FFFH 000007FFH 0000FFFH 0000FFFH 000007FFH 000007FFH 000007FFH 000007FFH 000007FFH 000007FFH 0000007FFH 0000007FFH 0000007FFH 0000007FFH 00000007FFH 0000000000	068	01494028h 0000FFFh FFFFFFFFFFFF FFFFFFFFFFFFFFF	01463824h  0000FFFFh  07h  06h  07h  07h  00h  00000000h  00003824h  0000FFFFh  00000  00000000h  00000000	10A00001h	0000004h	0000020h  20A5FFFFh  00000002h  105h  05h  05h  0000002h  0000007FFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	. 0000024h	39085556h	2009FFFF 000000000 N FFFFFFFF N FFFFFFFF N FFFFFFFF N FFFFFFFF	312AFFFF  FFFFFFFF  OAA  OAA  OAA  FFFFFFFF	00000
0ASFFFFN         34ASFFFFN           000000301         000000020           1FFFFFFFN         0000007FFN           0000         1Fh           0000         0000FFFN           0000         0000FFFN           0000         0000           0000         0000002h           00000031         0000002h           00000032         0000002h           00000033         FFFFFFA0           0000002h         0000FFFN           0000002h         0000FFFN           0000002h         00000FFFN           0000002h         0000002h           0000002h         0000002h           0000002h         0000002h           00000002h         0000FFFN           0000002h         0000002h           0000002h         0000FFFN           0000002h         0000FFFN           0000002h         0000FFFN           0000002h         0000FFFN           0000FFFN         0000FFFN           0000FFFN         0000FFFN           0000FFFN         0000FFFN           0000FFFN         0000FFFN           0000FFFN         0000FFFN           0000FFFN         0000FFFN <td>39085555h</td> <td>  2009FFFF.    200000000     200000000     300000000     400000000     500000000     500000000     600000000     7FFFFFF     7000000000     7FFFFFF     7000000000     7FFFFFF     7000000000000     7FFFFFF     7000000000     70000000000000000000</td> <td>312AFFFFH PFFFFFFFFH 0000FFFFh 0AAh 0AAh 0AAh 0AAh 0AAh 0FFFFFFFFFH 0000FFFFh 0000FFFFh 0000FFFFh 0000FFFFh 0000FFFFh 0000FFFFh 0000FFFFh 0000FFFFh 00000FFFFh 00000FFFFh 00000001h 000000001h 05h 05h 05h 05h 05h 05h 05h</td> <td>  01493025h   C  0149</td> <td>01494028h 0000FFFFh FFFFFFFFFFF FFFFFFFF 0000FFFF 0000FFFF 000004028h FFFFF0000h 0000033ch 0000097FFh 00000035ch 000007FFFh 000005FFFh 000005FFFh 000005FFFh 000005FFFh 000005FFFh 000005FFFH 000005FFFH 000005FFFH 000005FFFH</td> <td>01463824h  0000FFFFh  07h  06h  07h  07h  00h  07h  00000000h  00000324h  0000FFFh  00000000h  00000000h  FFFFFFFF</td> <td>  10.000001h</td> <td>0000004h 0000000h 0000000h 0000000h 0000000h 000000</td> <td>00000020h  20A5FFFFh  00000002h  FFFFFFFF  0000002h  0000007FFFFFFFF</td> <td>\$ 0000003ch  \$ 00000024h  \$ 0000001h  \$ 0000FFFFh  \$ 0000001h  \$ 00000001h  \$ 0000001h  \$ 00000001h  \$ 0000001h  \$ 00000001h  \$ 00000001h  \$ 00000001h  \$ 00000001</td> <td>39085555h 0000FFFh 00005AAAAh 00005AAAAh 00005AAAAh 00005AAAAh 00006FFFh 00005FFA 00005AAAAh 000004Ch 00005FFA 00005AAAAh 000004Ch 00005FFA 000004Ch 000004Ch 000004Ch 000004AAAAh 000004Ch 00000000h 00005FFA 000004Ch 000004Ch 000004Ch 00000000h 00005FFA 0000004Ch 00000000h 0000000h 0000000h 0000000h 000000</td> <td>2009FFFFH</td> <td>312AFFFF FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF</td> <td>0000F</td>	39085555h	2009FFFF.    200000000     200000000     300000000     400000000     500000000     500000000     600000000     7FFFFFF     7000000000     7FFFFFF     7000000000     7FFFFFF     7000000000000     7FFFFFF     7000000000     70000000000000000000	312AFFFFH PFFFFFFFFH 0000FFFFh 0AAh 0AAh 0AAh 0AAh 0AAh 0FFFFFFFFFH 0000FFFFh 0000FFFFh 0000FFFFh 0000FFFFh 0000FFFFh 0000FFFFh 0000FFFFh 0000FFFFh 00000FFFFh 00000FFFFh 00000001h 000000001h 05h 05h 05h 05h 05h 05h 05h	01493025h   C  0149	01494028h 0000FFFFh FFFFFFFFFFF FFFFFFFF 0000FFFF 0000FFFF 000004028h FFFFF0000h 0000033ch 0000097FFh 00000035ch 000007FFFh 000005FFFh 000005FFFh 000005FFFh 000005FFFh 000005FFFh 000005FFFH 000005FFFH 000005FFFH 000005FFFH	01463824h  0000FFFFh  07h  06h  07h  07h  00h  07h  00000000h  00000324h  0000FFFh  00000000h  00000000h  FFFFFFFF	10.000001h	0000004h 0000000h 0000000h 0000000h 0000000h 000000	00000020h  20A5FFFFh  00000002h  FFFFFFFF  0000002h  0000007FFFFFFFF	\$ 0000003ch  \$ 00000024h  \$ 0000001h  \$ 0000FFFFh  \$ 0000001h  \$ 00000001h  \$ 0000001h  \$ 00000001h  \$ 0000001h  \$ 00000001h  \$ 00000001h  \$ 00000001h  \$ 00000001	39085555h 0000FFFh 00005AAAAh 00005AAAAh 00005AAAAh 00005AAAAh 00006FFFh 00005FFA 00005AAAAh 000004Ch 00005FFA 00005AAAAh 000004Ch 00005FFA 000004Ch 000004Ch 000004Ch 000004AAAAh 000004Ch 00000000h 00005FFA 000004Ch 000004Ch 000004Ch 00000000h 00005FFA 0000004Ch 00000000h 0000000h 0000000h 0000000h 000000	2009FFFFH	312AFFFF FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	0000F
100000031	39085555h	2009FFFF    2009FFFF    200900000    300900000    3009000000    4009000000    500900000    500900000    600900000    600900000    700900000    700900000    700900000    700900000    700900000    700900000    700900000    700900000    700900000    70090000000    7009000000    7009000000    7009000000    7009000000    7009000000    7009000000    7009000000    7009000000    7009000000    7009000000    7009000000    7009000000    7009000000    7009000000    7009000000    7009000000    7009000000    7009000000    700900000    700900000    700900000    700900000    700900000    700900000    700900000    700900000    700900000    700900000    700900000    700900000    700900000    700900000    700900000    700900000    700900000    70090000    70090000    70090000    70090000    70090000    70090000    700900    700900	312AFFFFH PFFFFFFFH 0000FFFFH 0AA 0AA 0AA 0AB FFFFFFFFH 0000FFFH 00000FFFH 00000FFFH 00000FFFH 00000FFFH 00000FFFH 00000001h FFFFFFFFFH 00000001h 0FFFH 00000001h 0FFFH 00000001h 0FFFFFFFFFH 00000001h 0FFFFFFFFH 00000001h 0FFFFFFFFH 00000001h 0FFFFFFFFH 00000001h 0FFFFFFFFH 00000001h 00000001h	00000000   000000000   000000000   000000	01494028h 0000FFFFh FFFFFFFFFFFFFFFFFFFFFFFFFFF	01463824h  0000FFFFh  07h  06h  07h  06h  00000000h  000003824h  0000FFFFh  00000  00000000h  00000000	10A00001h	0000004h	00000020h 0000002h 00000001h 0000002h 00000009h 7	\$ 0000003ch  \$ 00000024h  \$ 0000001h  \$ 0000FFFFh  \$ 0000001h  \$ 00000001h  \$ 0000001h  \$ 00000001h  \$ 0000001h  \$ 00000001h  \$ 00000001h  \$ 00000001h  \$ 00000001	39085556h  0000FFFh  0000AAAAh  00005569h  000007FFh  0000FFFh  0000FFFh  0000FFFh  0000FFFh  0000FFFh  0000FFFh  0000AAAAh  0000002ch  00006000ch  00000000ch  00000000ch  00000000ch  00000000	2009FFFFF 2009000000 2009000000 20090000000000	312AFFFF FFFFFFFF	00000
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0000002h	39085555A	2006FFFP  1   0000000h   1   FFFFFFP   1   0900000h   1   0000000h   1   00000000h   1   0	312AFFFFFF  FFFFFFFFF  0000FFFF  0AA  0AA	06h	01494028h 0000FFFFh FFFF0000h 08h 08h 0000FFFh 0000FFFh FFFF0000h 00000355h 00000355Sh 0000FFFh 00000FFFh 0000055SSh 00000FFFh 00000FFFH 00000FFFH 000005SSSh	01463824h  0000FFFFh  07h  06h  07h  000000000  00003824h  000000000  0000FFFFh  0000000000  00518E090h  0000FFFFh  14  15  16  17  18  18  18  18  18  18  18  18  18	10.000001h	0000004h 0000000h 0000000h 0000000h 0000000h 000000	0000020h  20A5FFFFh  00000002h  105h  05h  0000002h  0000007FFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	, 0000024h  34A3FFFFh  00000001h  0000FFFh  X  0000FFFh  X  0000FFFh  X  0000FFFh  X  0000FFFh	39085555h 0000FFFh 00000FFFh 000000000000000	2009FFFFH 2009000000 X FFFFFFFFH X 99h X 90000000h X 99h X 99h X 99h X 9000001FP X 99h X 9	3124FFFF   1FFFFFFFFF   1Fh   20Ah   2000FFFF   1Fh   20Ah   20Ah   20FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	014939   0
100000021	39085555h	2009FFFP  1000000000	312AFFFFH FFFFFFFFH 0000FFFFH 0Ah 0Ah 0Ah 0Ah 0Ah 0Ah 0FFFFFFFFH 0000FFFH 00000FFFH 00000FFFH 00000FFFH 00000FFFH 000000FFFH 000000FFFH 000000FFFH 0000000TH 1 05h 05h 05h 05h 00000000TH FFFFFFFFH 0000000TH FFFFFFFFFH 0000000TH FFFFFFFFFH 0000000TH FFFFFFFFH 0000000TH FFFFFFFFH 0000000TH FFFFFFFFH 0000000TH FFFFFFFFH 000000TH FFFFFFFFH FFFFFFFH FFFFFFFH FFFFFFFH FFFFFF	05493025h   06h   07h	01494028h 0000FFFFh FFFFFFFFFFF FFFFFFFFF 0000428h 08h 0000FFFh 0000428h FFFFFFFFF FFFFF000h 0000033ch 0000033ch 000005556h 000005555h 0000FFFFh 000005555h 0000FFFFh 000005555h 0000FFFFh 000005555h	01463824h  0000FFFFh  07h  06h  07h  07h  00h  00h  00h  00	10A00001h	0000004h 0000000h 0000000h 0000000h 0000000h 000000	0000020h 0000002h	. 0000024h	39085556h	2009FFFFH	312AFFFF FFFFFFFFF  3000FFFF  300000000	01493/000000  00000000000000000000000000000
0ASFFFF         X4ASFFFF           00000030         000000020           1FFFFFFF         0000007FFP           0000         1Fh           00000002         00000FFFP           0000         0000FFFP           0000         0000002           0000003         0000002           0000003         0000002           0000003         0000002           0000003         00000FFFP           0000002         0000FFFP           0000002         0000FFFP           0000002         0000FFFP           0000002         0000002           0000002         0000002           0000002         0000002           0000002         0000002           0000002         000000           0000002         000000           0000002         00000           0000000         00000           0000000         00000           0000000         00000           0000000         0000FFFP           0000000         0000FFFP           00000         0000FFFP           0000         000FFFP           0000         000FFFP           0000         000FFFP <td>39085555h</td> <td>  2006FFFF,   2000000000</td> <td>312AFFFFH FFFFFFFFH 0000FFFFH 0AAh 0AAh 0AAh 0AAh 0AAh 0FFFFFFFFH 0000FFFH 0000FFFH 00000FFFH 00000FFFH 00000FFFH 00000FFFH 00000FFFH 00000054h 0000FFFH 00000054h 00000FFFH 00000054h 00000FFFH 00000054h 000000054h 0000000054h 000000054h 00000000054h 000000054h 00000054h 00000054h 00000054h 000000054h 00000054h 0000054h 000054h 000054h 000054h 000054h 000054h 000054h 000</td> <td>  064   066</td> <td>01494028h 0000FFFF FFFFFFFFF FFFFFFFF 0000FFFF 0000FFFF FFFFFF</td> <td>01463824h  0000FFFFh  07h  07h  07h  07h  07h  0</td> <td>  10.000001h</td> <td>0000004h 0000000h 0000000h 0000000h 0000000h 000000</td> <td>0000020h  20A5FFFFh  00000002h  105h  05h  0000002h  0000007FFFFFFFFFFFFFFFFFFFFFFFFFFFFFF</td> <td>, 0000024h</td> <td>  39085555h   0000FFFh   0000054h   000000001h   0000000001h   0000000000</td> <td>2009FFFFF  2009000000  X FFFFFFFFF  X 99h  X 09h  X</td> <td>312AFFFFF  FFFFFFFFFF  OAh  OAh  OAh  FFFFFFFF  OOOFFFF  OOOOFFFF  OOOOFFFF  OOOOFFFF  OOOOFFFF  OOOOFFFF  OOOOFFFF  OOOOFFFF  OOOOFFFF  OOOOOFFFF  OOOOOFFFF  OOOOOFFFF  OOOOOFFFF  OOOOOO</td> <td>00000</td>	39085555h	2006FFFF,   2000000000	312AFFFFH FFFFFFFFH 0000FFFFH 0AAh 0AAh 0AAh 0AAh 0AAh 0FFFFFFFFH 0000FFFH 0000FFFH 00000FFFH 00000FFFH 00000FFFH 00000FFFH 00000FFFH 00000054h 0000FFFH 00000054h 00000FFFH 00000054h 00000FFFH 00000054h 000000054h 0000000054h 000000054h 00000000054h 000000054h 00000054h 00000054h 00000054h 000000054h 00000054h 0000054h 000054h 000054h 000054h 000054h 000054h 000054h 000	064   066	01494028h 0000FFFF FFFFFFFFF FFFFFFFF 0000FFFF 0000FFFF FFFFFF	01463824h  0000FFFFh  07h  07h  07h  07h  07h  0	10.000001h	0000004h 0000000h 0000000h 0000000h 0000000h 000000	0000020h  20A5FFFFh  00000002h  105h  05h  0000002h  0000007FFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	, 0000024h	39085555h   0000FFFh   0000054h   000000001h   0000000001h   0000000000	2009FFFFF  2009000000  X FFFFFFFFF  X 99h  X 09h  X	312AFFFFF  FFFFFFFFFF  OAh  OAh  OAh  FFFFFFFF  OOOFFFF  OOOOFFFF  OOOOFFFF  OOOOFFFF  OOOOFFFF  OOOOFFFF  OOOOFFFF  OOOOFFFF  OOOOFFFF  OOOOOFFFF  OOOOOFFFF  OOOOOFFFF  OOOOOFFFF  OOOOOO	00000
0ASFFFFN         VAASFFFFN           0000003D         00000002D           0000003D         00000002D           1FFFFFFN         00000FFFN           00000003D         00000FFFN           0000003D         00000002D           0000003D         00000002D           0000003D         00000002D           0000003D         FFFFFA0N           0000003D         FFFFFA0N           0000002D         0000FFFN           0000002D         0000FFFN           0000002D         0000FFFN           0000002D         00000FFFN           0000002D         0000002D           0000002D         0000002D           0000002D         0000002D           0000002D         0000002D           0000002D         00000002D           0000002D         0000002D           0000002D         00000FFFN           0000000000D         0000FFFN           0000000D	39085555h	2009FFFF    2009000000     2009000000     3009000000     4009000000     5009000000     5009000000     5009000000     5009000000     5009000000     5009000000     5009000000     50090000000000000000000000000000000000	312AFFFFH PFFFFFFFFH 0000FFFFH 0Ah 0Ah 0Ah 0Ah 0Ah 0FFFFFFFFH 0000FFFH 00000FFFH 00000FFFH 00000FFFH 00000001h 00000001h 0FFFFFFFH 000000001h 0FFFFFFFH 000000001h 0FFFFFFFH 000000001h 0FFFFFFFH 000000001h 0FFFFFFFH 000000001h 0FFFFFFFH 000000001h 0FFFFFFFFH 000000001h 000000001h 000000001h 00000000	0493025h   C  0493025h   C  069   C	01494028h 0000FFFFh FFFFFFFFFFF FFFFFFFF 00000FFFF 00000FFFF 000000	01463824h  0000FFFFh  07h  06h  07h  00h  00h  00h  00h  00	10.400001h	0000004h 0000000h 0000000h 0000000h 0000000h 000000	00000020h  20A5FFFFh  00000002h  105h  05h  05h  05h  0000002h  0000002h  0000002h  0000002h  0000002h  0000002h  0000002h  0000002h  0000002h  0000007FFFFFFFFF  7  7  0000003h  0149402eh  0000FFFF  FFFFFFFF  FFFFFFF  00000FFFF  000000	, 00000024h	39085556h 0000FFFh 00005AAAA 00005656h 00000FFFh 00005556h 00000FFFh 000005556h 000007FFh 00005556h 000007FFh 00005556h 000007FFh 00005556h 000004AAAAh 0000002Ch 00005556h 000004AAAAh 0000002Ch 00005556h 000004AAAAh 0000002Ch 0000000Ch 000000000000000000	2009FFFFF  2009000000  2009FFFFFFF  2009000000  20090000000000	312AFFFF FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	0000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   000000
	39085555h	2009FFFF    2009FFFF    200900000    200900000    300900000    300900000    400900000    50090000    50090000    50090000    50090000    50090000    50090000    50090000    50090000    50090000    50090000    50090000    50090000    50090000    500900000    5009000    5009000    5009000    5009000    5009000    5009000    5009000    5009000    500900	312AFFFFH FFFFFFFFH 0000FFFFH 0Ah 0Ah 0Ah 0Ah 0Ah 0Ah 0FFFFFFFFH 0000FFFH 0000FFFH 0000FFFH 0000FFFH 00000FFFH 0000FFFH 0000FFFH 000007FFFH 0000007FFFH 0000007FFFH 0000007FFFH 0000007FFFH 0000007FFFH 00000007FFFH 00000007FFFH 0000000000	068	01494026h 0000FFFFh FFFFFFFFFFFFFFFFFFFFFFFFFFF	01463824h  0000FFFFh  07h  06h  07h  07h  07h  00h  00000000h  000003824h  0000FFFFh  00000000h  00000FFFH  00000000h  000000FFFH  0000000000	10A00001h	0000004h 0000000h 0000000h 0000000h 0000000h 000000	0000002h 0000003h 0000003h 0000007FFFFFFFFF 00000007FFFFFFFFFF 00000007FFFFFFFF	, 00000024h	39085556h 0000FFFh 00005AAAA 00005656h 00000FFFh 00005556h 00000FFFh 000005556h 000007FFh 00005556h 000007FFh 00005556h 000007FFh 00005556h 000004AAAAh 0000002Ch 00005556h 000004AAAAh 0000002Ch 00005556h 000004AAAAh 0000002Ch 0000000Ch 000000000000000000	2009FFFFF  2009000000  2009FFFFFFF  2009000000  20090000000000	312AFFFFF  FFFFFFFFFF  OAh  OAh  OAh  FFFFFFFF  OOOFFFF  OOOOFFFF  OOOOFFFF  OOOOFFFF  OOOOFFFF  OOOOFFFF  OOOOFFFF  OOOOFFFF  OOOOFFFF  OOOOOFFFF  OOOOOFFFF  OOOOOFFFF  OOOOOFFFF  OOOOOO	0000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   000000
16	39085555h	2009FFFF    2009FFFF    200900000    200900000    300900000    300900000    400900000    50090000    50090000    50090000    50090000    50090000    50090000    50090000    50090000    50090000    50090000    50090000    50090000    50090000    500900000    5009000    5009000    5009000    5009000    5009000    5009000    5009000    5009000    500900	312AFFFFH FFFFFFFFH 0000FFFFH 0Ah 0Ah 0Ah 0Ah 0Ah 0Ah 0FFFFFFFFH 0000FFFH 0000FFFH 0000FFFH 0000FFFH 00000FFFH 0000FFFH 0000FFFH 000007FFFH 0000007FFFH 0000007FFFH 0000007FFFH 0000007FFFH 0000007FFFH 00000007FFFH 00000007FFFH 0000000000	068	01494026h 0000FFFFh FFFFFFFFFFFFFFFFFFFFFFFFFFF	01463824h  0000FFFFh  07h  06h  07h  07h  07h  00h  00000000h  000003824h  0000FFFFh  00000000h  00000FFFH  00000000h  000000FFFH  0000000000	10A00001h	0000004h 0000000h 0000000h 0000000h 0000000h 000000	0000002h 0000003h 0000003h 0000007FFFFFFFFF 00000007FFFFFFFFFF 00000007FFFFFFFF	\$ 0000024h  \$ 34A8FFFFh  \$ 0000001h  \$ 0000FFFFh  \$ 0000FFFFh  \$ 0000001h  \$ 0000FFFFh  \$ 0000001h  \$ 0000FFFFh  \$ 0000001h  \$ 0000FFFFh  \$ 00000028h  \$ 0000FFFFh  \$ 0000028h  \$ 0000FFFFh  \$ 00000028h  \$ 0000FFFFh  \$ 0000007FFFh  \$ 00000028h  \$ 0000FFFFh  \$ 0000007FFFh  \$ 00000000000000000000000000000000000	39085556h 0000FFFh 00005AAAA 00005656h 00000FFFh 00005556h 00000FFFh 000005556h 000007FFh 00005556h 000007FFh 00005556h 000007FFh 00005556h 000004AAAAh 0000002Ch 00005556h 000004AAAAh 0000002Ch 00005556h 000004AAAAh 0000002Ch 0000000Ch 000000000000000000	2009FFFFF	312AFFFF FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	0000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   000000
0ASFFFFN	39085555h	2009FFFF    2009000000     3000000000     4000000000     500000000     500000000     6000000000     600000000     600000000     600000000     600000000     600000000     600000000     600000000     600000000     6000000000     600000000     600000000     600000000     600000000     600000000     600000000     600000000     6000000000     6000000000     600000000     6000000000     6000000000     6000000000     6000000000     60000000000	312AFFFFH PFFFFFFFH 0000FFFFH 00Ah 0Ah 0Ah 0Ah 0Ah FFFFFFFFH 0000FFFH 00000FFFH 0000FFFH 00000FFFH 00000FFFH 00000FFFH 00000001h FFFFFFFFFH 0000000000h 0FFFFFFFFH 000000000h 0FFFFFFFFFH 000000000h 0FFFFFFFFFH 00000000h 0FFFFFFFFFH 00000000h 0FFFFFFFFFH 00000000h 00000000h 00000000h 00000000		01494028h 0000FFFFh FFFFFFFFFFFFFFFFFFFFFFFFFFF	01463824h  0000FFFFh  07h  06h  07h  00h  00h	10.400001h	0000004h 0000000h 0000000h 0000000h 0000000h 000000	00000020h 0000002h 0000002h 00000002h 00000002h 00000002h 00000002h 00000000	\$ 00000024h  \$ 34A8FFFFh  \$ 0000001h  \$ 0000FFFFh  \$ 0000FFFFh  \$ 0000001h  \$ 0000FFFFh  \$ 0000001h  \$ 0000FFFFh  \$ 0000001h  \$ 0000FFFFh  \$ 00000028h  \$ 0000FFFFh  \$ 00000000000000000000000000000000000	39085556h 0000FFFh 0000565h 0000FFFh 000056h 0000015h 000005556h 000007FFh 00005556h 000067FFh 00005556h 000067FFh 00005556h 000067FFh 00005556h 000067FFh 00005556h 000067FFh 00005556h 00006556h 0000656h 0000656h 000066h	2009FFFFF  000000000  X FFFFFFFF  X 000000000  X 099  000000000  X 099  X 000000000  X FFFFFFFF  X 000000000  X 099  X 000000000  X FFFFFFFF  00000000  X FFFFFFFF  00000000  X FFFFFFFF  0000000  X FFFFFFFF  0000000  X FFFFFFFF  000000000  X FFFFFFFF  0000000000	312AFFFF FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	014939   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   000000
0ASFFFFN	39085555h	2009FFFF    2009000000     3000000000     4000000000     500000000     500000000     6000000000     600000000     600000000     600000000     600000000     600000000     600000000     600000000     600000000     6000000000     600000000     600000000     600000000     600000000     600000000     600000000     600000000     6000000000     6000000000     600000000     6000000000     6000000000     6000000000     6000000000     60000000000	312AFFFFH PFFFFFFFH 0000FFFFH 00Ah 0Ah 0Ah 0Ah 0Ah FFFFFFFFH 0000FFFH 00000FFFH 0000FFFH 00000FFFH 00000FFFH 00000FFFH 00000001h FFFFFFFFFH 0000000000h 0FFFFFFFFH 000000000h 0FFFFFFFFFH 000000000h 0FFFFFFFFFH 00000000h 0FFFFFFFFFH 00000000h 0FFFFFFFFFH 00000000h 00000000h 00000000h 00000000		01494028h 0000FFFFh FFFFFFFFFFFFFFFFFFFFFFFFFFF	01463824h  0000FFFFh  07h  06h  07h  00h  00h	10.400001h	0000004h 0000000h 0000000h 0000000h 0000000h 000000	00000020h 0000002h 0000002h 00000002h 00000002h 00000002h 00000002h 00000000	\$ 00000024h  \$ 34A8FFFFh  \$ 0000001h  \$ 0000FFFFh  \$ 0000FFFFh  \$ 0000001h  \$ 0000FFFFh  \$ 0000001h  \$ 0000FFFFh  \$ 0000001h  \$ 0000FFFFh  \$ 00000028h  \$ 0000FFFFh  \$ 00000000000000000000000000000000000	39085556h 0000FFFh 0000565h 0000FFFh 000056h 0000015h 000005556h 000007FFh 00005556h 000067FFh 00005556h 000067FFh 00005556h 000067FFh 00005556h 000067FFh 00005556h 000067FFh 00005556h 00006556h 0000656h 0000656h 000066h	2009FFFFF  2009000000  2009FFFFFFFF  2009000000  2009000000  20090000000000	312AFFFF FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	014939   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   00000   000000
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63 64	65	66	67	68 1	69 '	70 '	71 '	72 '
00000054h X 00	000058h X							0000005Ch
00084403h X 00	0843C2h X							08000017h
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80000000h X 00	008000h							00000017h
00008000h X 00	000001h							00000017h
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08h	X							00h
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08h	X							00h
							00000000h	
00000010h 00	00000Fh							00000000h
00000010h 00	00000Fh							00000000h
80000000h X 00	008000h							00000000h
00004403h 00	0043C2h							00000017h
80000000h X 00	008000h							00000017h
00008000h X 00	000001h							00000017h
							00000000h	
00008000h X 00	000001h							00000000h
00000058h X 00	00005Ch							00000060h
00011064h 00	010F64h							000000BCh
							00000000h	
0021100Ch 00	210F08h							0000005Ch
00000058h							000	0005Ch
00008000h X 00	000001h							00000000h

最后也是可以看到死循环在 finish 语句。

## 五、总结与心得

不足:我们设计的 cpu 仍然还是很简陋的,仅仅局限在实现这个程度,而没有考虑效率和速度,而且还是单周期的,能处理的异常和中断也仅有四种。但是我相信我们已经具备了去学习这样的底层 cpu 的能力,如果日后需要我们会在次学习更高层次的知识,去实现更好更完善的更快的cpu。

收获:本次实验虽然采用的书上的设计,但是我们自己动手实现更是加深了我们对 cpu 的记忆和理解,相信在很长一段时间内我们都不会忘记,并且用到的时候还会很快回忆起来,因为这个 cpu 确实花费了我们很多精力。在实现过程中对 bug 的调试也是锻炼了我们调试程序的能力,相信对我们的编程能力也有一定提升。最后就是增加了我们的信心,我们可以付出精力去改变我们想要改变的事情,并且逐渐变得熟练。

## 六、参考文献

[1]计算机原理与设计: Verilog HDL 版