Problem 1: Symbol Table (14points)

1. [1] Y [2] OBJECT [3] 00000004 [4] 4
   [5] COM [6] GLOBAL [7] 12 [8] 3
   [9] Y [10] 12 [11] 4 [12] Y
   [13] FUNC [14] 00000000 [15] 1 [16] Y
   [17] NOTYPE [18] 00000000 [19] 0 [20] UND

2. 7 2 0 8

Problem 2: PIC (8points)

1. [1]*0x804a018 [2] 8048336

2. 0x08049f14

3. the real address of function printf.

Problem 3: Linking (20points)

1. [1] 0x4 [2] fc ff ff ff
   [3] (%eax) [4] 08 00 00 00

2. [5] 00000008 [6] R_386_PC32
   [7] 0000000c [8] a
   [9] 00000004 [10] R_386_ 32
   [11] fun1 [12] 00000000

3. [13] 08040a34
   [14] 0804a01c
   [15] 08048414
   [16] 080483f3: c7 05 38 a0 04 08 04 00 00 00 movl $0x4,0x804a038
   [17] 080483fd: e8 12 00 00 00 call 8048414 <fun2>
   [18] 08048407: a1 28 a0 04 08 mov 0x804a028,%eax
   [19] 08048417: e8 e8 ff ff ff call 8048404 <fun1>
   [20] 0804a02c: 24 a0 04 08

Problem 4: HCL (8points)

1. bool xor = (!a && b) || (a && !b);
2. int Out = [

```
!s2 && !s1 && !s0 : A; # 000
!s2 && !s1 && s0  : B; # 001
!s2 && s1 && !s0  : C; # 010
!s2 && s1 && s0   : D; # 011
!s1 && !s0        : E; # 100
!s1               : F; # 101
!s0               : G; # 110
1                 : H; # 111
```

   ];

3. int Max4 = [

```
A>=B && A>=C && A>=D : A;
B>=C && B>=D :        B;
C>=D :                C;
1:                    D;
```

   ];

Problem 5: Y86 (15points)

1. [1]8024000000 [2]0x014 [3]0x014
   [4]233 [5]0x024 [6]pushl %ebx
   [7]30f214000000 [8]0x048 [9]6003
   [10]subl %ebx, %ecx
2. [1]0xfffff304 [2]0x1000
   [3]1 [4]0 [5]0

Problem 6: Processor (35points)

1.

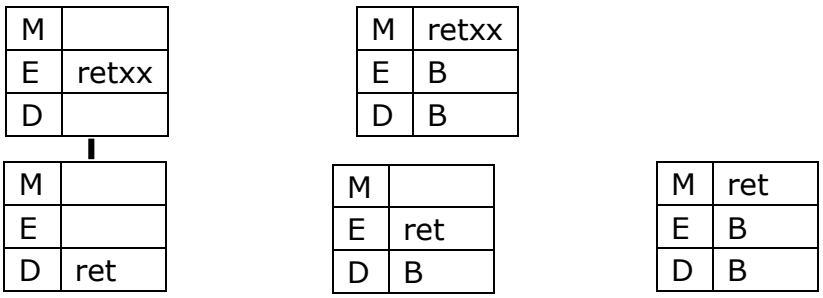
Field	retxx
Fetch	icode:ifun <- M1[PC] valP <- PC+1
Decode	valA <- R[%esp] valB <- R[%esp]
Execute	valE <- valB + 4 Cnd <- Cond(CC, ifun)
Memory	valM <- M4[valA]
Write Back	if(Cnd) R[%esp] <- valE
PC update	PC <- Cnd ? valM : valP

2.

Condition	Trigger
condition ret	IRETXX in {E_icode, M_icode} && Cnd

Condition	Pipeline register				
	F	D	E	M	W
condition ret	S	B	B	-	-

3.



Condition	Pipeline register				
	F	D	E	M	W
condition ret	S	B	B	-	-
ret	S	B	-	-	-
combination	S	B	B	-	-

4. [1] 3 [2] 0.06 [3] 0.36
   [4] 0.03 [5] 0.015 [6] 1.465

5. [1] 25 [2] 7 [3] 22 [4] 3