

Homework 9

Problem 1

main.c	print.c
<pre>char *p = "hello"; void print(); int main { print(); return 0; }</pre>	<pre>#include <stdio.h> extern char *p; char *p1 = "world\n"; static char *p2 = "hello moto!" void print() { printf("%s %s", p, p1); } static void print2() { printf("%s", p2); }</pre>

Indicate the type of the following symbols, e.g. **defined global**, **referenced global** or **local**

File	Symbol	Type
main.c	p	
	print	
print.c	p	
	p1	
	p2	
	print	
	print2	

Problem 2

```
#include <stdio.h>
```

```
int c = 5;
```

```
int arr[10];
```

```
void print(int x) {
```

```
    static int y = 7;
```

```
    int b = x + 1;
```

```
    printf("%d\n", b);
```

```
}
```

Indicate the location of the following symbols, e.g. .data, .bss, .text or stack.

Symbol	Location
c	
arr	
y	
b	
print	

Problem 3

Consider the following C code and its relocatable object file.

```
extern int p3(void);
int x = 1;
int *xp = &x;
```

```
void p2(int y) {
}
```

```
void p1() {
    p2(*xp + p3());
}
```

.text

00000000 <p2>:

0:	55	push%ebp
1:	89 e5	mov %esp, %ebp
3:	89 ec	mov %ebp, %esp
5:	5d	pop %ebp
6:	c3	ret

00000008 <p1>:

8:	55	push%ebp
9:	89 e5	mov %esp, %ebp
b:	83 ec 08	sub \$0x8, %esp
e:	83 c4 f4	add \$0xffffffff4, %esp
11:	e8 fc ff ff ff	call 12 <p1+0xa>
16:	89 c2	mov %eax, %edx
18:	a1 00 00 00 00	mov 0x0, %eax
1d:	03 10	add (%eax), %edx
1f:	52	push%edx
20:	e8 fc ff ff ff	call 21 <p1+0x19>
25:	89 ec	mov %ebp, %esp
27:	5d	pop %ebp
28:	c3	ret

.data

00000000 <x>:

0: 01 00 00 00

00000004 <xp>:

4: 00 00 00 00

A. When the module is relocated, what change will happen in .text section? List their information in relocation entry, including **OFFSET**, **TYPE** and **VALUE**.

1	RELOCATION RECORDS FOR [.text]:		
2	OFFSET	TYPE	VALUE
3	00000012	R_386_PC32	p3
4	_____	_____	___
5	_____	_____	___

B. When the module is relocated, what change will happen in .data section? List their information in relocation entry, including **OFFSET**, **TYPE** and **VALUE**.

1	RELOCATION RECORDS FOR [.data]:		
2	OFFSET	TYPE	VALUE
3	_____	_____	___

Good luck for mid-term examination!
Maybe a bit more difficult than last year's