一. 第二章题目

1. 给定一个实数, 会因为该实数表示成单精度浮点数 (`float`) 而发生误差。不考虑NaN和Inf的情况, 该绝对误差的最大值为_____**A**_____

   A. 2^{103} B. 2^{104} C. 2^{230} D. 2^{231}

2. 运行下述代码，结果为：___$2^{24}+1$___

```
for (int x = 0; ; ++x) {
    float f = x;
    if (x != (int)f) {
        printf("%d", x);
        break;
    }
}
```

3. 运行下述代码，结果为：**2, -1, 0, 1, -2, -1, 0, 1**

```
int x = 33554466;  // 2^25+34
int y = x + 8;
for(; x < y; ++x){
    float f = x;
    printf("%d", x - (int)f);
}
```

4. 在遵守 IEEE 754 标准的一台机器上声明如下三个变量`double f, g, h`，判断：

   若`f > g`，则`f + 1 > g + 1`：_____**F**_____

   若`f > g && g > 1`，则`f - 1 > g - 1`：_____**F**_____

二.【汇编大题】以下提供了一段代码的 C 语言、汇编语言以及运行到某一时刻栈的情况

I. 互相翻译 C 语言代码和汇编代码，补充缺失的空格（标号相同的为同一格）。

```
0000000000400596 <func>:
400596: sub $0x28,%rsp
40059a: mov (4)____,%rax
4005a3: mov %rax,0x18(%rsp)
4005a8: xor %eax,%eax
4005aa: mov (%rdi),%rax
4005ad: mov 0x8(%rdi),%rdx
4005b1: cmp %rdx,%rax
4005b4: jge (1)____
4005b6: mov %rdx,(%rdi)
4005b9: mov %rax,0x8(%rdi)
4005bd: mov 0x8(%rdi),%rax
4005c1: test %rax,%rax
4005c4: jne 4005cb <func+0x35>
4005c6: mov (%rdi),%rax
4005c9: jmp (2)____
4005cb: mov (%rdi),%rdx
4005ce: sub %rax,%rdx
4005d1: mov %rdx,(%rsp)
4005d5: mov %rax,0x8(%rsp)
4005da: mov (3)____ ,%rdi
4005dd: callq 400596 <func>
4005e2: mov 0x18(%rsp),%rcx
4005e7: xor %fs:0x28,%rcx
4005f0: (5)____ 4005f7 <func+0x61>
4005f2: callq 400460 <__stack_chk_fail@plt>
4005f7: add (6)____,%rsp
4005fb: retq

00000000004005fc <main>:
4005fc: sub $0x28,%rsp
400600: mov %fs:0x28,%rax
400609: mov %rax,0x18(%rsp)
40060e: xor %eax,%eax
400610: movq 0x69,(%rsp)
400618: movq 0xfc,0x8(%rsp)
```

放 canary

if(p->a<p->b)

swap(p->a, p->b)

if(p->b==0)

jmp to ret

递归

检查 canary

ret

->成栈、放 canary

p

```
400621: mov %rsp,%rdi
400624: callq 400596 <func>
400629: mov %rax,%rsi
40062c: mov $0x4006e4,%edi
400631: mov $0x0,%eax
400636: callq 400470 <printf@plt>
40063b: mov 0x18(%rsp),%rdx
400640: xor (4)____,%rdx
400649: (5)____ 400650 <main+0x54>
40064b: callq 400460 <__stack_chk_fail@plt>
400650: mov $0x0,%eax
400655: add (6)____ ,%rsp
400659: retq
```

call func

call printf

检查 canary

ret.

```
typedef struct{ long a; long b; } pair_type;
long func(pair_type *p) {
    if (p->a < p->b) {
        long temp = p->a;
        p->a = p->b;
        p->b = temp;
    }
    if ((7)____ ) return p->a;
    pair_type np;
    np.a = (8)____;
    np.b = (9)____;
    return func(&np);
}
int main(int argc, char* argv[]) {
    pair_type np;
    np.a = (10)____;
    np.b = (11)____ ;
    printf("%ld", func(&np));
    return 0;
}
```

(1) _____ (5) _____ (9) _____

(2) _____ (6) _____ (10) _____

(3) _____ (7) _____ (11) _____

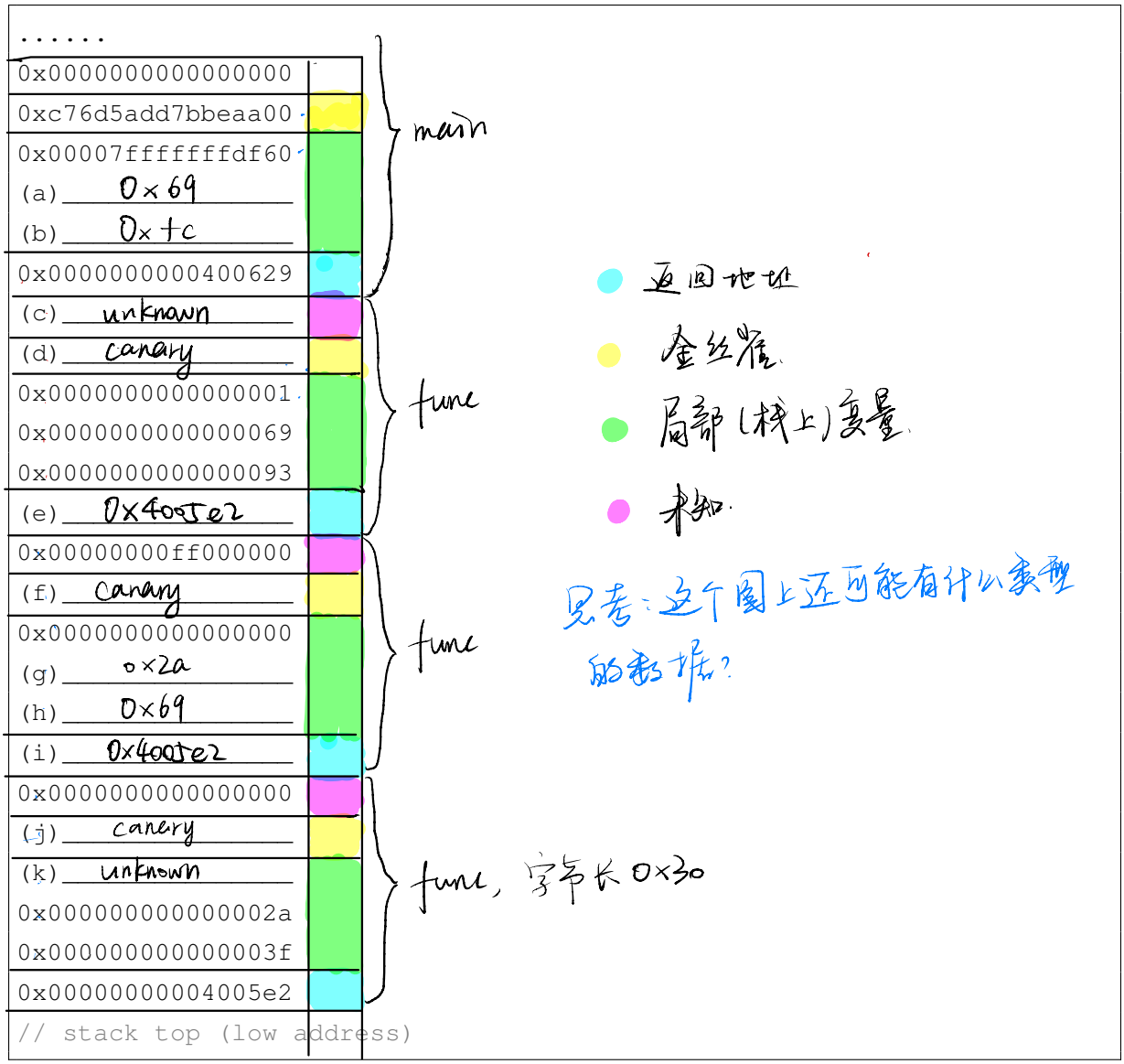
(4) _____ (8) _____

0x7c = 0x93
0x69

附: 一些可能用到的字符的 ASCII 码表

\n	space	"	%	(	)	,	0	A	a
0x0a	0x20	0x22	0x25	0x28	0x29	0x2c	0x30	0x41	0x61

II. 补充栈的内容。使用 16 进制，可以不写前导多余的 0；对于给定已知条件后仍无法确定的值，填写“不确定”；已知程序运行过程中寄存器%fs 的值没有改变



III. 程序运行结果为_____.

答:

I.

```
(1) 4005bd <func+0x27>
(2) 4005e2 <func+0x4c>
(3) %rsp
(4) %fs:0x28
(5) je
(6) $0x28
(7) p->b == 0
(8) p->a - p->b
(9) p->b
(10) 105
(11) 252
```

II.

```
......
    0x0000000000000000(u)
    0xc76d5add7bbeaa00
    0x00007fffffffdf60(u?)
(a) 0x0000000000000069
(b) 0x00000000000000fc
    0x0000000000400629
(c) // unknown
(d) 0xc76d5add7bbeaa00
    0x0000000000000001(u)
    0x0000000000000069
    0x0000000000000093
(e) 0x00000000004005e2
    0x00000000ff000000(u)
(f) 0xc76d5add7bbeaa00
    0x0000000000000000(u)
(g) 0x000000000000002a
(h) 0x0000000000000069
(i) 0x00000000004005e2
    0x0000000000000000(u)
(j) 0xc76d5add7bbeaa00
(k) // unknown
```

```
    0x000000000000002a
    0x000000000000003f
    0x00000000004005e2
// stack top (low address)
```

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