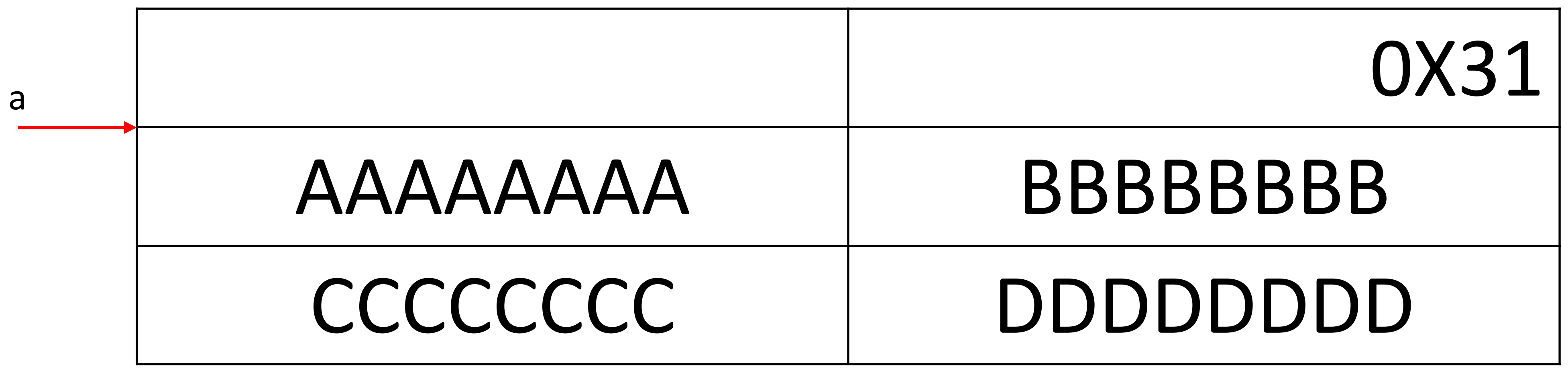
UAF

CyKor 정수환

https://github.com/1nteger-c/uaf

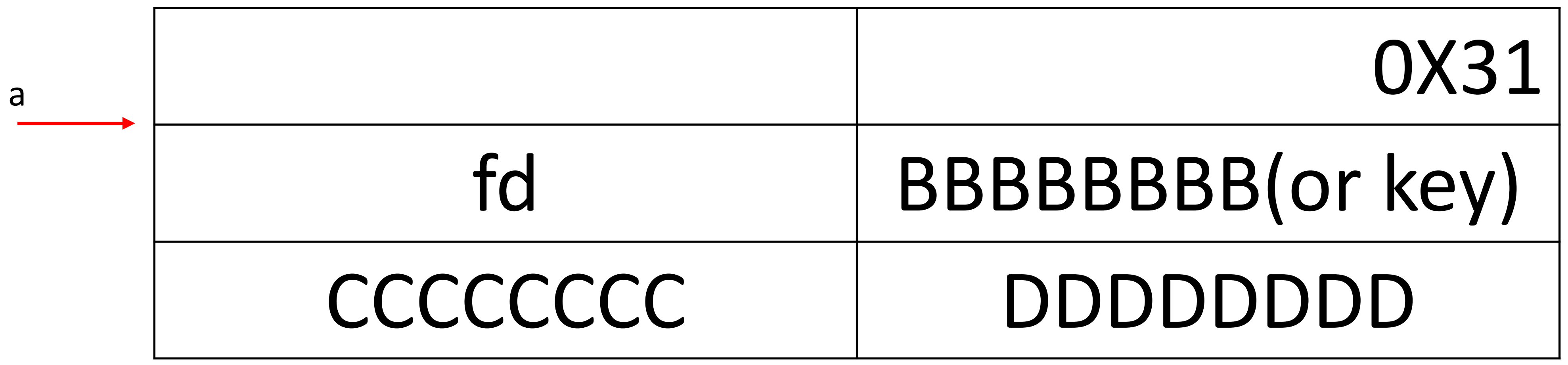
UAF (Use - After - Free)

```
a = malloc(0x20)
```



UAF (Use - After - Free)

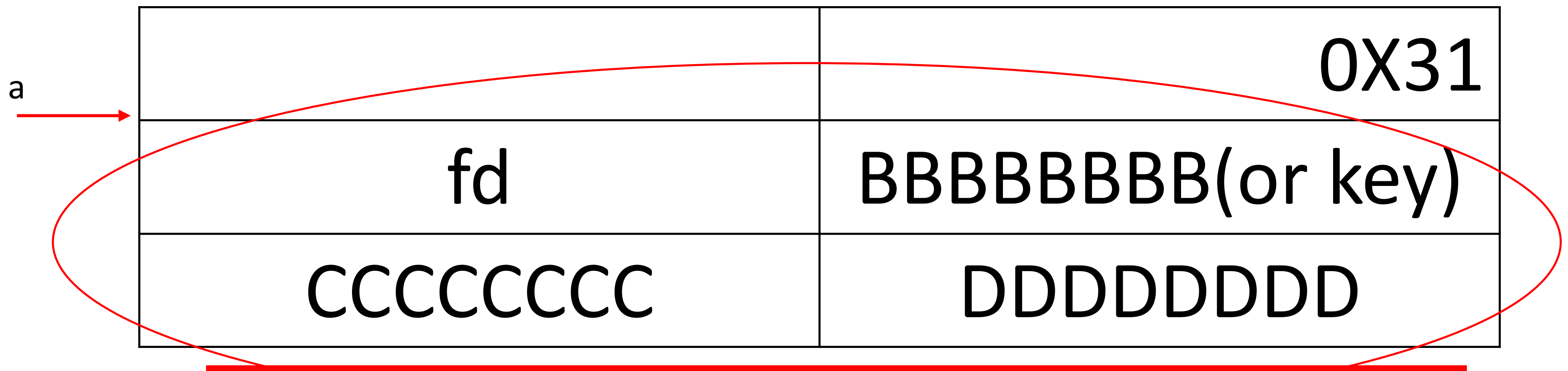
a = malloc(0x20) ->free()



	0X31
fd	BBBBBBBB(or key)
CCCCCCCC	DDDDDDDD

UAF (Use - After - Free)

a = malloc(0x20) ->free()

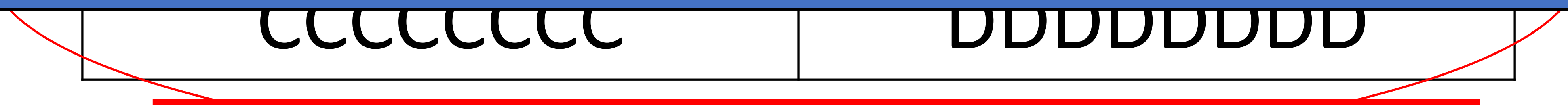


데이터가 사라지지 않음!!!

UAF (Use - After - Free)

a = malloc(0x20) ->free()

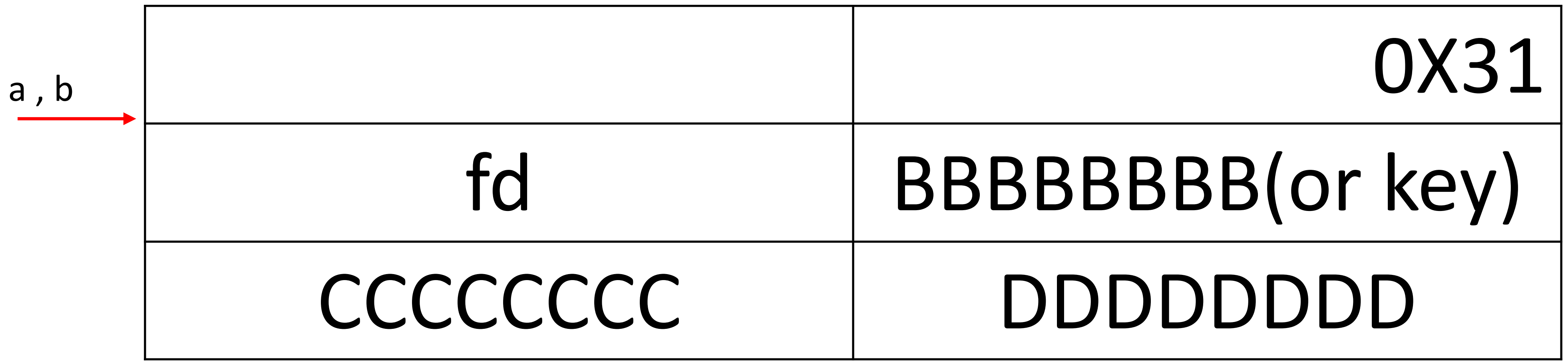
여기서 malloc(0x20)을 하면??



데이터가 사라지지 않음!!!

UAF (Use - After - Free)

a = malloc(0x20) ->free() ->   b = malloc(0x20) : 아래와 동일한 곳에 할당..!

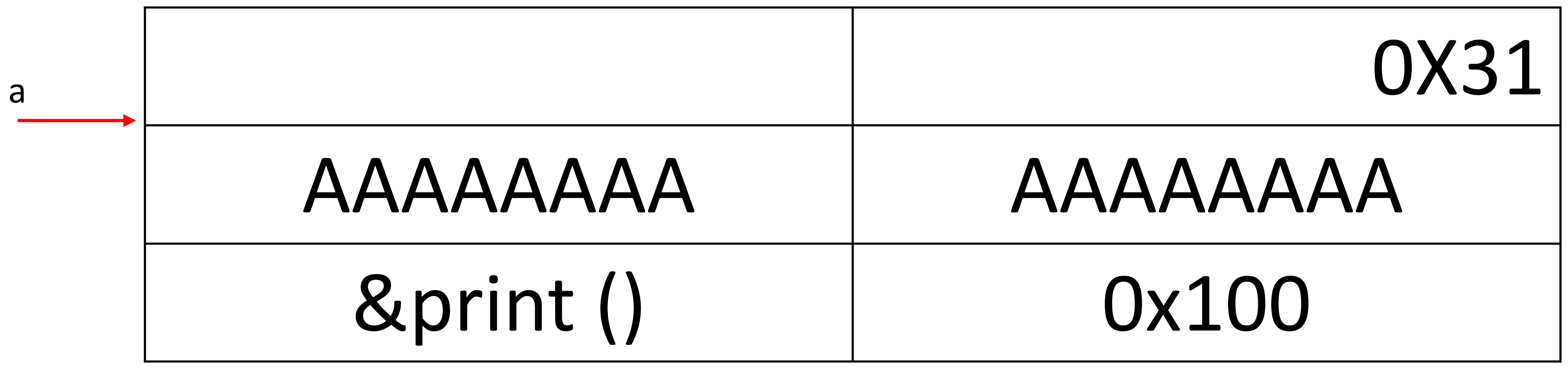


	0X31
fd	BBBBBBBB(or key)
CCCCCCCC	DDDDDDDD

UAF (Use - After - Free)

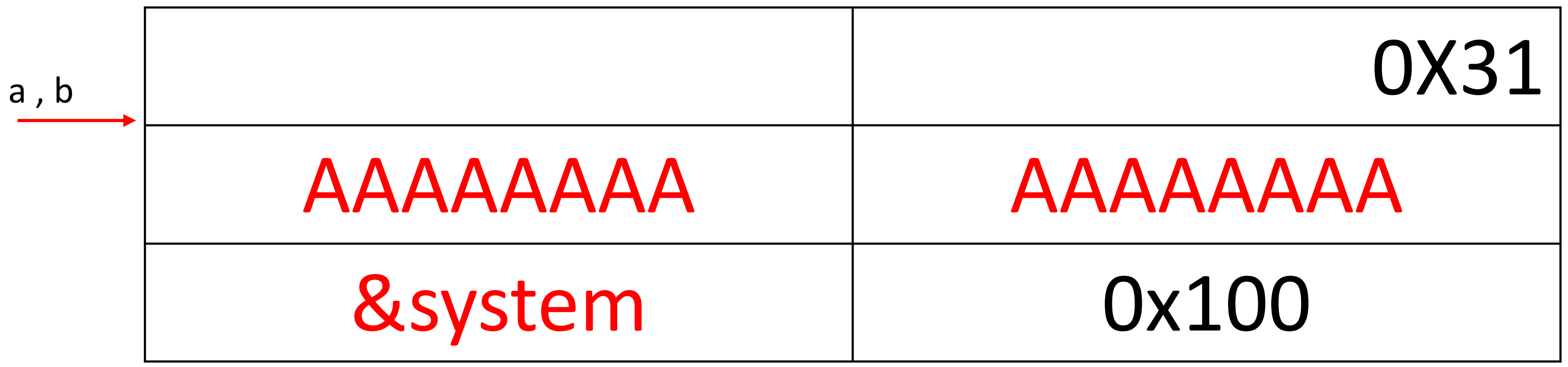
```
struct Name{
char name[0x10];
void(*print_name)(void*);
score();
}

Name * a = malloc(0x20)
```



UAF (Use - After - Free)

a = malloc(0x20) ->free() ->   b = malloc(0x20)



UAF (Use - After - Free)

a = malloc(0x20) ->free() ->   b = malloc(0x20)

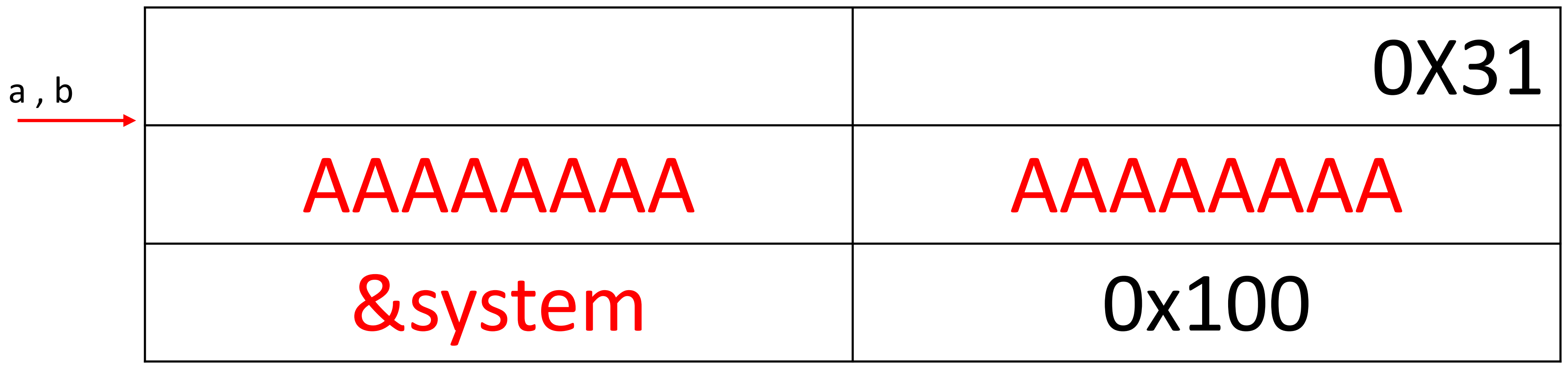
a , b

	0X31
AAAAAAAA	AAAAAAAA
&system	0x100

만약, 여기서 a를 이용해서 print_name함수를 호출한다면??

UAF (Use - After - Free)

a = malloc(0x20) ->free() ->   b = malloc(0x20)



	0X31
AAAAAAAA	AAAAAAAA
&system	0x100

만약, 여기서 a를 이용해서 print_name함수를 호출한다면??

system 호출 가능..!

Double Free

- Free -> Free ??

```
a = mallloc(0x30);
free(a);
free(a);
```

Double Free

- 16.04 (ERROR)

- a = mallloc(0x30);
- free(a);
- free(a);

- 18.04 (OK)

- a = mallloc(0x30);
- free(a);
- free(a);

- 20.04 (OK)

- a = mallloc(0x30);
- free(a);
- free(a);

Double Free

- 16.04 (ERROR)

- a = mallloc(0x30);
- free(a);
- free(b);
- free(a);

- 18.04 (OK)

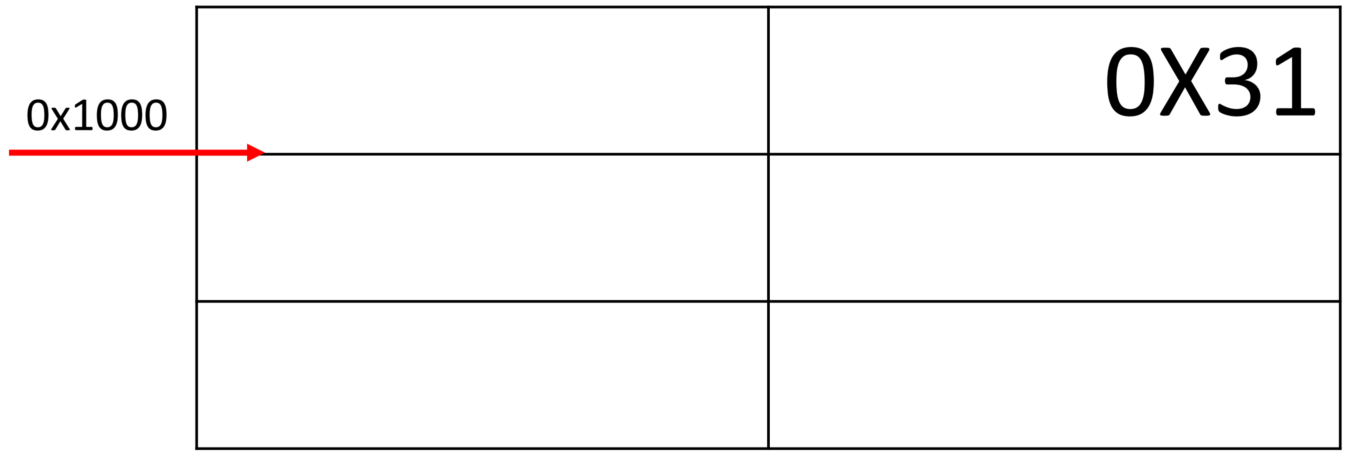
- a = mallloc(0x30);
- free(a);
- free(a);

- 20.04 (OK)

- a = mallloc(0x30);
- free(a);
- a의 key 자리 overwrite
- free(a);

Tcache - dup

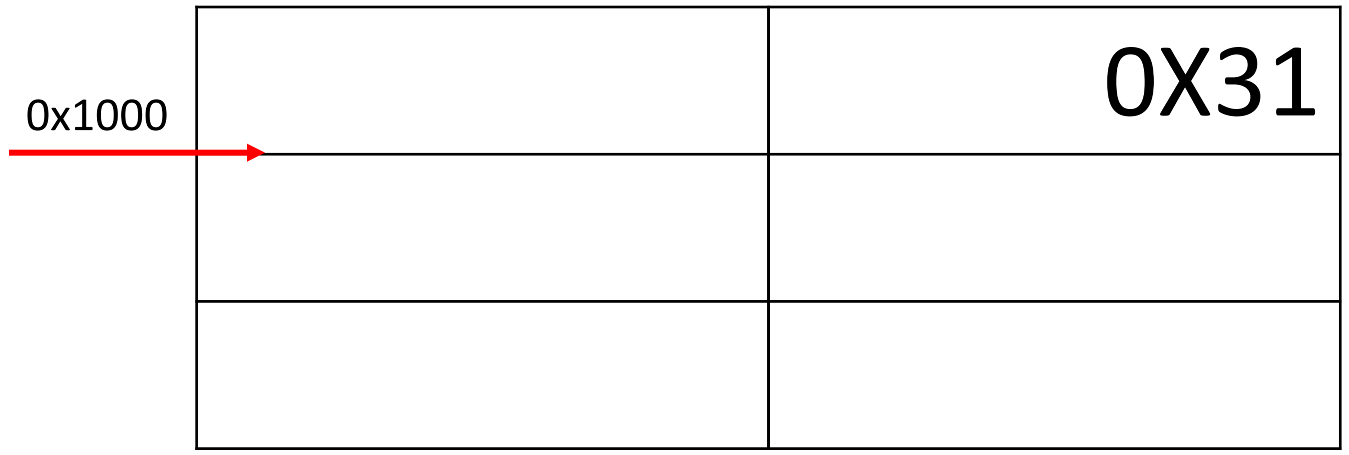
```
a = malloc(0x20);
free(a);
```



tcache_bin : 0x1000

Tcache - dup

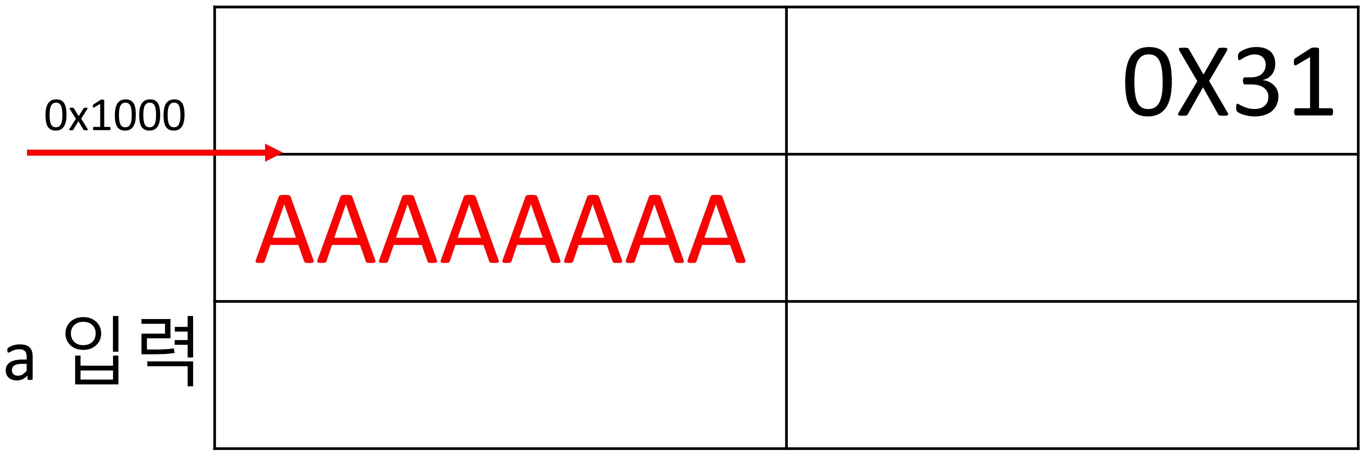
```
a = malloc(0x20);
free(a);
free(a);
```



tcache_bin : 0x1000 -> 0x1000

Tcache - dup

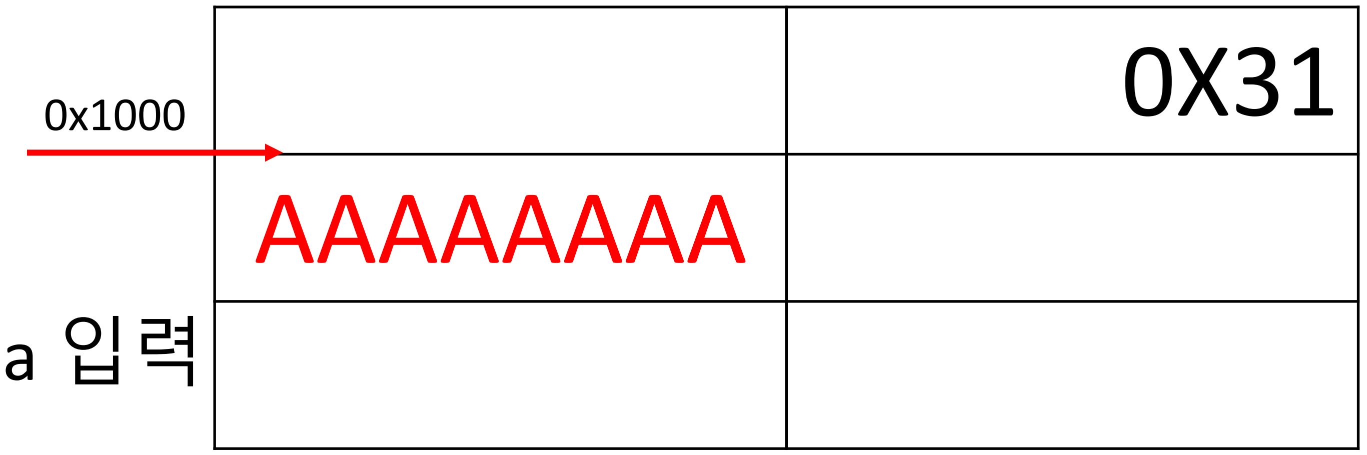
```
a = malloc(0x20);
free(a);
free(a);
b = malloc(0x20); //0xaaaaaaaa 입력
```



tcache_bin : 0x1000 -> 0xAAAAAAAA

Tcache - dup

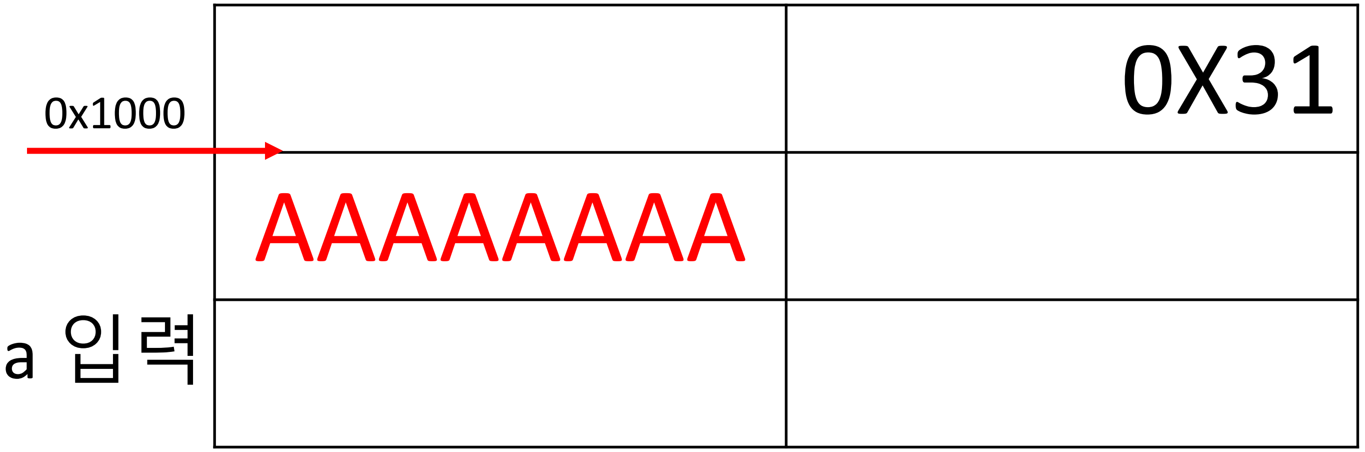
```
a = malloc(0x20);
free(a);
free(a);
b = malloc(0x20); //0xaaaaaaaa 입력
c = malloc(0x20);
```



tcache_bin : 0xAAAAAAAA

Tcache - dup

```
a = malloc(0x20);
free(a);
free(a);
b = malloc(0x20); //0xaaaaaaaa 입력
c = malloc(0x20);
d = malloc(0x20);   // 0xAAAAAAAA에 chunk 할당..!
```



tcache_bin :

- 어디에 ? 무엇으로 ? 덮어야 할까요

Hook (__malloc_hook / __free_hook)

oneshot_gadget

과제

- git에 함께 첨부되어 있는 homework/tcache
  18.04 / 20.04 에서 각각 Exploit 해보기

(18.04가 더 쉬우니 18.04먼저 하세요)

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