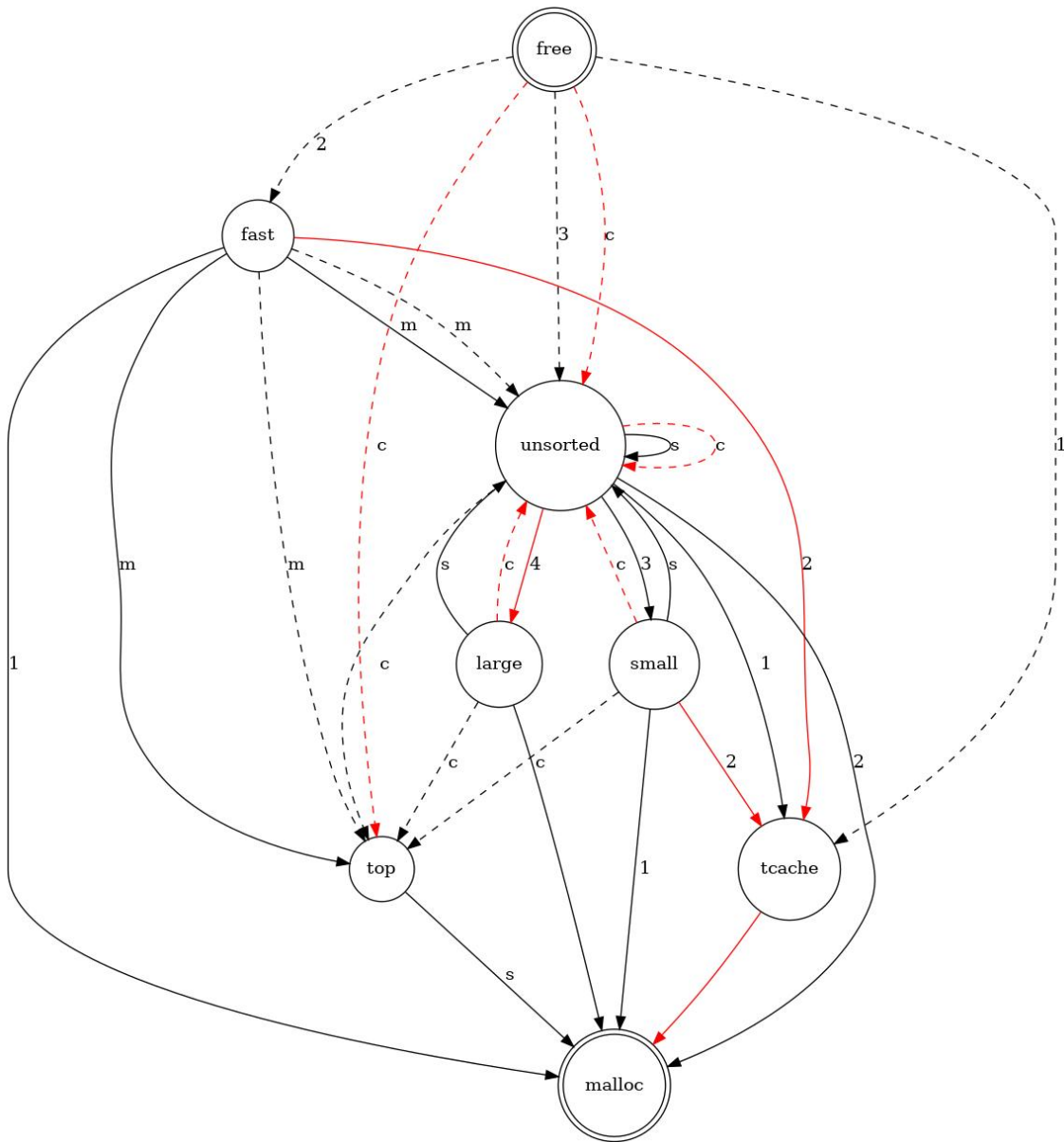


# Heap Pwn Cheat Sheet

## Transition



symbol	description
arrow	malloc
dotted arrow	free
red arrow	weak path
c	(for back)word consolidate
m	malloc consolidate

s	split the chunk
1 ~ 4	priority (1: high, 4: low)

path	method	description
fast → malloc	malloc	1st chunk in fast bin when tcache is empty
fast → tcache	malloc	2nd ~ 8th chunks in fast bin when tcache is empty
unsorted → tcache	malloc	1st ~ 7th just-fit chunks in unsorted bin when tcache is empty
unsorted → malloc	malloc	8th just-fit chunk in unsorted bin when tcache is empty
small → malloc	malloc	1st chunk in small bin when tcache is empty
small → tcache	malloc	2nd ~ 8th chunks in unsorted bin when tcache is empty

## Bins

	size	type
tcache	0x20 ~ 0x410	FILO
fast	0x20 ~ 0x80	FILO
unsorted	0x20 ~	FIFO
small	0x20 ~ 0x3f0	FIFO
large	0x400 ~	FIFO

## Mmap

The following conditions are required for mmap to be called.

```
SIZE >= mp_mmap_threshold && SIZE > main_arena->top.size however main_arena->top.size
<= main_arena->system_mem
```

Therefore, if you reserve a chunk with a size larger than 0x21000, mmap will be called.

variable	initial value
mp_mmap_threshold	0x20000
main_arena->system_mem	0x21000

## Double Free

1st \ nth	tcahe	fast	unsorted
tcache	X	X	X
fast	O	O	-

unsorted [0x20 ~ 0x80]	O	O	X
unsorted [0x90 ~ 0x410]	O	-	X
unsorted [0x420 ~]	-	-	X
small [0x20 ~ 0x80]	O	O	X
small [0x90 ~ 0x3f0]	O	-	X
large [0x400, 0x410]	O	-	X
large [0x420 ~]	-	-	X

## Variables

variable	trigger	memo
__malloc_hook	malloc	
__free_hook	free	
__realloc_hook	realloc	
__after_morecore_hook	sbrk	
__malloc_initialize_hook	malloc (at initialization)	
__memalign_hook	aligned_alloc, memalign, posix_memalign, valloc	
_dl_open_hook	dlopen, dlsym	
_rtld_global._dl_ns[0]._ns_loaded	_dl_fini	_rtld_global is in ld.so
global_max_fast		
.fini_array		
__printf_arginfo_table, __printf_function_table	printf	
stderr, fs:[0x30], vtable == _IO_cookie_jumps	_IO_file_sync	Whether stderr is in libc or exe depends on the code. debug and check __malloc_assert
__exit_funcs, fs:[0x30]	__run_exit_handlers	
tls_dtor_list, fs:[0x30]	__call_tls_dtors	

