

OS Homework 1 Re-Do

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1. (a) The activation record is the data structure which stores information used by a function: the return address, parameters, and local variables and is found on the stack.
- (b) malloc allocates on the heap, so the value of theSum would be an address on the heap.
- (c) As i is a local variable, it would be stored on the stack.
- (d) As low is a global variable, it would be stored in the heap.
- (e) The instruction to call limit (line 11) would be in the code.
- (f) Defined symbols are symbols declared within a program. Undefined symbols are external symbols with no definition within the program.

symbol	defined/undefined
low	defined
high	defined
(g) main	defined
malloc	undefined
limit	undefined
printf	undefined

2. (c) file runs filesystem tests, magic tests, and language tests. Assuming object file named a.out for magic file list
 - i. if \$HOME/.magic.mgc or \$HOME/.magic exists, will be used in preference to /usr/share/misc/magic.mgc and /usr/share/misc/magic/*
 - ii. /usr/share/misc/magic.mgc
 - iii. /usr/share/misc/magic/*
 - iv. a.out
 - v. elf.h
 - vi. a.out.h
 - vii. exec.h
- (d) tictac is identified as executable, and it was statically linked.
- (e) strace runs the command after it, aka file with tictac as input and prints out the functions called. Then, grep open goes through and only shows the lines from strace's output where open was called.
 - i. "/usr/lib64/tls/x86_64/libmagic.so.1" - not successful
 - ii. "/usr/lib64/tls/libmagic.so.1" - not successful
 - iii. "/usr/lib64/x86_64/libmagic.so.1" - not successful
 - iv. "/usr/lib64/libmagic.so.1"

- v. `"/usr/lib64/tls/libz.so.1"` - not successful
 - vi. `"/usr/lib64/libz.so.1"`
 - vii. `"/usr/lib64/tls/libc.so.6"` - not successful
 - viii. `"/usr/lib64/libc.so.6"`
 - ix. `"/usr/lib/locale/locale-archive"`
 - x. `"/etc/magic.mgc"` - not successful
 - xi. `"/etc/magic"`
 - xii. `"/usr/share/misc/magic.mgc"`
 - xiii. `"/usr/lib64/gconv/gconv-modules.cache"`
 - xiv. `"tictac"`
- (f) `blind.o` is an ELF relocatable, or object file, not yet compiled to be executable.
- (g) i. `atoi` - undefined symbol
- ii. `g` - uninitialized data, treated as undefined, but appears in heap.
- iii. `limit` - defined, appears in code section
- (j) We do not have the source code for `limit`; it was defined in `blind.o`.
- (l) `argv[1]` is a string, or `char[]`.
- (m) It took 6 steps after the breakpoint. The values in the argument list are: the integer `low` at -10, integer `high` at 10, and `str` with a value of `"10"`.
- (n) `x` reformats an input, in this case from hex to string. The value printed out was `"10"`
- (o) The address of the statement immediately following `limit` is `0x0000000000400e3c`. The statement will be executed 3 times.

3.