Valgrind:

-> There are many tools using with valgrinds but most comman tool is “memcheck”.

The problems memcheck can detect and warn about include the following:-

1) use of unintialized memory.

2) Reding/writting memory after it has been free'd.

3) Reading/writting off the end of malloc'd blocks.

4) memory leaks.

-> Different options using valgrind.

1) **--trace-children=<yes|no> [default: no]**

When enabled, Valgrind will trace into sub-processes initiated via

the exec system call. This is necessary for multi-process programs.

Note that Valgrind does trace into the child of a fork (it would be

difficult not to, since fork makes an identical copy of a process),

so this option is arguably badly named. However, most children of

fork calls immediately call exec anyway.

2) **--vgdb=<no|yes|full> [default: yes]**

Valgrind will provide "gdbserver" functionality when --vgdb=yes or

--vgdb=full is specified. This allows an external GNU GDB debugger

to control and debug your program when it runs on Valgrind.

3) **--time-stamp=<yes|no> [default: no]**

When enabled, each message is preceded with an indication of the

elapsed wallclock time since startup, expressed as days, hours,

minutes, seconds and milliseconds.

4) **--log-file=<filename>**

Specifies that Valgrind should send all of its messages to the

specified file. If the file name is empty, it causes an abort.

There are three special format specifiers that can be used in the

file name.

-> malloc() Related options:-

1)  **--alignment=<number> [default: 8 or 16, depending on the platform]**

By default Valgrind's malloc, realloc, etc, return a block whose

starting address is 8-byte aligned or 16-byte aligned (the value

depends on the platform and matches the platform default). This

option allows you to specify a different alignment. The supplied

value must be greater than or equal to the default, less than or

equal to 4096, and must be a power of two.

2) **--redzone-size=<number> [default: depends on the tool]**

Valgrind's malloc, realloc, etc, add padding blocks before and

after each heap block allocated by the program being run. Such

padding blocks are called redzones. The default value for the

redzone size depends on the tool. For example, Memcheck adds and

protects a minimum of 16 bytes before and after each block

allocated by the client. This allows it to detect block underruns

or overruns of up to 16 bytes.

-> massif :

-Massif is a heap profiler. It measures how much heap memory your program uses. This includes both the useful space, and the extra bytes allocated for book-keeping and alignment purposes. It can also measure the size of your program’s stack(s), although it does not do so by default.

Heap profiling can help you reduce the amount of memory your program uses.

memory, this provides the following benefits:

On modern machines with virtual

• It can speed up your program -- a smaller program will interact better with your machine’s caches and avoid paging.

• If your program uses lots of memory, it will reduce the chance that it exhausts your machine’s swap space.

-> Running massif:

1) valgrind –tool=massif ./a.out

2) It create one file named massif.out.<pid>

3) Read this file using ms\_print massif.out.<pid>

-> Lackey :

- This tool does various kinds of vasic program measurement.

1) **--trace-mem=<no|yes> [default: no]**

When enabled, Lackey prints the size and address of almost every memory access made by the program. See the comments at the top of the file lackey/lk\_main.c for details about the output format, how it works, and inaccuracies in the address trace. Note that this option produces immense amounts of output.

2) **--fnname=<name> [default: main]**

Changes the function for which calls are counted when --basic-counts=yes is specified.

-> SGcheck :

- When a source file is compiled with -g, the compiler attaches DWARF3 debugging information which describes the location of all stack and global arrays in the file.

- we can use valgrind **–tool=exp-sgcheck ./a.out**

**NOTE** :-

Using valgrind tool our programe execution speed is reduced 20-30 times.