Using **valgrind** tool to detect the memory management issues in C Programming language:  
  
**valgrind** tool is used for debugging and profiling the linux programs. By using valgrind tool we can automatically detect the many memory management and threading bugs thus making your program more stable.  
  
To demonstrate the usage of **valgrind** tool I have written a c program which performs the operations below:  
1. usage of un-initialized memory  
2. Memory leak (not freeing the allocated memory dynamically)  
3. Used freed memory  
4. Overshooting the memory (access the memory beyond the allocated range)  
5. Not freeing the memory allocated by using realloc ()  
6. Using un-initialized variable  
7. double freeing of the memory  
  
Install the valgrind tool in system by using the below command:  
**# sudo apt-get install valgrind**  
  
verify the installation using the below command:  
**# valgrind --version**  
  
compile the program using below command :  
**# gcc <program\_name.c> -g std=c11 -lm -o <program\_name or executable\_name>**  
  
Run the program with valgrind tool:  
**# valgrind --track-origins=yes --leak-check=full ./executable\_name**  
  
It is clearly evident that from the below result, valgrind tool detected double free'd of the memory and also it shows the function and line number where exact the issue is.  
**NOTE: uncomment the functions in the code to check the corresponding behaviour using valgrind tool.**

