

Λειτουργία 1:

```
103ws19:/home/students/cs/2019/mvasil17/EPL232/Homework4>valgrind --leak-check=full --show-reachable=yes --num-callers=20 --track-fds=yes --track-origins=yes ./bmpSteganography -list image1.bmp
```

```
==3629594== Memcheck, a memory error detector
```

```
==3629594== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
```

```
==3629594== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
```

```
==3629594== Command: ./bmpSteganography -list image1.bmp
```

```
==3629594==
```

```
BITMAP_FILE_HEADER
```

```
=====
```

```
bfType: BM
```

```
bfSize: 499554
```

```
bfReserved1: 0
```

```
bfReserved2: 0
```

```
bfOffBits: 54
```

```
BITMAP_INFO_HEADER
```

```
=====
```

```
biSize: 40
```

```
biWidth: 500
```

```
biHeight: 333
```

```
biPlanes: 1
```

```
biBitCount: 24
```

```
biCompression: 0
```

```
biSizeImage: 499500
```

```
biXPelsPerMeter: 0
```

```
biYPelsPerMeter: 0
```

```
biClrUsed: 0
```

```
biClrImportand: 0
```

```
Operation Successful==3629594==
```

```
==3629594== FILE DESCRIPTORS: 3 open at exit.  
==3629594== Open file descriptor 2: /dev/pts/3  
==3629594==  <inherited from parent>  
==3629594==  
==3629594== Open file descriptor 1: /dev/pts/3  
==3629594==  <inherited from parent>  
==3629594==  
==3629594== Open file descriptor 0: /dev/pts/3  
==3629594==  <inherited from parent>  
==3629594==  
==3629594==  
==3629594== HEAP SUMMARY:  
==3629594==   in use at exit: 0 bytes in 0 blocks  
==3629594== total heap usage: 2 allocs, 2 frees, 500,068 bytes allocated  
==3629594==  
==3629594== All heap blocks were freed -- no leaks are possible  
==3629594==  
==3629594== For counts of detected and suppressed errors, rerun with: -v  
==3629594== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
```

Λειτουργία 2:

```
103ws19:/home/students/cs/2019/mvasil17/EPL232/Homework4>valgrind --tool=memcheck --leak-check=full --show-reachable=yes --num-callers=20 --track-fds=yes --track-origins=yes  
./bmpSteganography -grayscale image1.bmp
```

```
==3635190== Memcheck, a memory error detector
```

```
==3635190== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
```

```
==3635190== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
```

```
==3635190== Command: ./bmpSteganography -grayscale image1.bmp
```

```
==3635190==
```

```
Operation Successful==3635190==
```

```
==3635190== FILE DESCRIPTORS: 3 open at exit.
```

```
==3635190== Open file descriptor 2: /dev/pts/3
```

```
==3635190== <inherited from parent>
```

```
==3635190==
```

```
==3635190== Open file descriptor 1: /dev/pts/3
```

```
==3635190== <inherited from parent>
```

```
==3635190==
```

```
==3635190== Open file descriptor 0: /dev/pts/3
```

```
==3635190== <inherited from parent>
```

```
==3635190==
```

```
==3635190==
```

```
==3635190== HEAP SUMMARY:
```

```
==3635190== in use at exit: 0 bytes in 0 blocks
```

```
==3635190== total heap usage: 4 allocs, 4 frees, 1,166,636 bytes allocated
```

```
==3635190==
```

```
==3635190== All heap blocks were freed -- no leaks are possible
```

```
==3635190==
```

```
==3635190== For counts of detected and suppressed errors, rerun with: -v
```

```
==3635190== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
```

Λειτουργία 3:

```
103ws19:/home/students/cs/2019/mvasil17/EPL232/Homework4>valgrind --tool=memcheck --leak-check=full --show-reachable=yes --num-callers=20 --track-fds=yes --track-origins=yes  
./bmpSteganography -encodeStegano 4 IMG_6865.bmp IMG_6875.bmp
```

```
==3692617== Memcheck, a memory error detector
```

```
==3692617== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
```

```
==3692617== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
```

```
==3692617== Command: ./bmpSteganography -encodeStegano 4 IMG_6865.bmp IMG_6875.bmp
```

```
==3692617==
```

```
Operation Successful==3692617==
```

```
==3692617== FILE DESCRIPTORS: 3 open at exit.
```

```
==3692617== Open file descriptor 2: /dev/pts/3
```

```
==3692617== <inherited from parent>
```

```
==3692617==
```

```
==3692617== Open file descriptor 1: /dev/pts/3
```

```
==3692617== <inherited from parent>
```

```
==3692617==
```

```
==3692617== Open file descriptor 0: /dev/pts/3
```

```
==3692617== <inherited from parent>
```

```
==3692617==
```

```
==3692617==
```

```
==3692617== HEAP SUMMARY:
```

```
==3692617== in use at exit: 0 bytes in 0 blocks
```

```
==3692617== total heap usage: 8 allocs, 8 frees, 7,561,721 bytes allocated
```

```
==3692617==
```

```
==3692617== All heap blocks were freed -- no leaks are possible
```

```
==3692617==
```

```
==3692617== For counts of detected and suppressed errors, rerun with: -v
```

```
==3692617== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
```

Λειτουργία 4:

```
103ws19:/home/students/cs/2019/mvasil17/EPL232/Homework4>valgrind --tool=memcheck --leak-check=full --show-reachable=yes --num-callers=20 --track-fds=yes --track-origins=yes
./bmpSteganography -decodeStegano 4 new-image1.bmp
```

```
==3667170== Memcheck, a memory error detector
```

```
==3667170== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
```

```
==3667170== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
```

```
==3667170== Command: ./bmpSteganography -decodeStegano 4 new-image1.bmp
```

```
==3667170==
```

```
==3667170== Conditional jump or move depends on uninitialised value(s)
```

```
==3667170== at 0x40193D: getEachPixel (in
/home/students/cs/2019/mvasil17/EPL232/Homework4/bmpSteganography)
```

```
==3667170== by 0x4010D3: main (in
/home/students/cs/2019/mvasil17/EPL232/Homework4/bmpSteganography)
```

```
==3667170== Uninitialised value was created by a stack allocation
```

```
==3667170== at 0x400AE1: main (in
/home/students/cs/2019/mvasil17/EPL232/Homework4/bmpSteganography)
```

```
==3667170==
```

```
==3667170== Conditional jump or move depends on uninitialised value(s)
```

```
==3667170== at 0x4C29B59: malloc (vg_replace_malloc.c:299)
```

```
==3667170== by 0x401983: getEachPixel (in
/home/students/cs/2019/mvasil17/EPL232/Homework4/bmpSteganography)
```

```
==3667170== by 0x4010D3: main (in
/home/students/cs/2019/mvasil17/EPL232/Homework4/bmpSteganography)
```

```
==3667170== Uninitialised value was created by a stack allocation
```

```
==3667170== at 0x400AE1: main (in
/home/students/cs/2019/mvasil17/EPL232/Homework4/bmpSteganography)
```

```
==3667170==
```

```
==3667170== Conditional jump or move depends on uninitialised value(s)
```

```
==3667170== at 0x401A9F: getEachPixel (in
/home/students/cs/2019/mvasil17/EPL232/Homework4/bmpSteganography)
```

```
==3667170== by 0x4010D3: main (in
/home/students/cs/2019/mvasil17/EPL232/Homework4/bmpSteganography)
```

```

==3667170== Uninitialised value was created by a stack allocation

==3667170== at 0x400AE1: main (in
/home/students/cs/2019/mvasil17/EPL232/Homework4/bmpSteganography)

==3667170==

==3667170== Conditional jump or move depends on uninitialised value(s)

==3667170== at 0x402CB7: decodeStegano (in
/home/students/cs/2019/mvasil17/EPL232/Homework4/bmpSteganography)

==3667170== by 0x401106: main (in
/home/students/cs/2019/mvasil17/EPL232/Homework4/bmpSteganography)

==3667170== Uninitialised value was created by a stack allocation

==3667170== at 0x400AE1: main (in
/home/students/cs/2019/mvasil17/EPL232/Homework4/bmpSteganography)

==3667170==

==3667170== Syscall param write(buf) points to uninitialised byte(s)

==3667170== at 0x5226FD0: __write_nocancel (in /usr/lib64/libc-2.17.so)

==3667170== by 0x51B20B2: _IO_file_write@@GLIBC_2.2.5 (in /usr/lib64/libc-2.17.so)

==3667170== by 0x51B38CD: _IO_do_write@@GLIBC_2.2.5 (in /usr/lib64/libc-2.17.so)

==3667170== by 0x51B3077: _IO_file_close_it@@GLIBC_2.2.5 (in /usr/lib64/libc-2.17.so)

==3667170== by 0x51A6077: fclose@@GLIBC_2.2.5 (in /usr/lib64/libc-2.17.so)

==3667170== by 0x40112A: main (in
/home/students/cs/2019/mvasil17/EPL232/Homework4/bmpSteganography)

==3667170== Address 0x4023000 is in a rw- anonymous segment

==3667170== Uninitialised value was created by a stack allocation

==3667170== at 0x400AE1: main (in
/home/students/cs/2019/mvasil17/EPL232/Homework4/bmpSteganography)

==3667170==

Operation Successful==3667170==

==3667170== FILE DESCRIPTORS: 3 open at exit.

==3667170== Open file descriptor 2: /dev/pts/3

==3667170== <inherited from parent>

==3667170==

==3667170== Open file descriptor 1: /dev/pts/3

==3667170== <inherited from parent>

```

==3667170==

==3667170== Open file descriptor 0: /dev/pts/3

==3667170== <inherited from parent>

==3667170==

==3667170==

==3667170== HEAP SUMMARY:

==3667170== in use at exit: 0 bytes in 0 blocks

==3667170== total heap usage: 4 allocs, 4 frees, 1,155 bytes allocated

==3667170==

==3667170== All heap blocks were freed -- no leaks are possible

==3667170==

==3667170== For counts of detected and suppressed errors, rerun with: -v

==3667170== ERROR SUMMARY: 5 errors from 5 contexts (suppressed: 0 from 0)

Λειτουργία 5:

```
103ws19:/home/students/cs/2019/mvasil17/EPL232/Homework4>valgrind --tool=memcheck --leak-check=full --show-reachable=yes --num-callers=20 --track-fds=yes --track-origins=yes  
./bmpSteganography -encodeText tux-bonaparte.bmp poem.txt
```

```
==3648032== Memcheck, a memory error detector
```

```
==3648032== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
```

```
==3648032== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
```

```
==3648032== Command: ./bmpSteganography -encodeText tux-bonaparte.bmp poem.txt
```

```
==3648032==
```

```
strlen: 279Operation Successful==3648032==
```

```
==3648032== FILE DESCRIPTORS: 3 open at exit.
```

```
==3648032== Open file descriptor 2: /dev/pts/3
```

```
==3648032== <inherited from parent>
```

```
==3648032==
```

```
==3648032== Open file descriptor 1: /dev/pts/3
```

```
==3648032== <inherited from parent>
```

```
==3648032==
```

```
==3648032== Open file descriptor 0: /dev/pts/3
```

```
==3648032== <inherited from parent>
```

```
==3648032==
```

```
==3648032==
```

```
==3648032== HEAP SUMMARY:
```

```
==3648032== in use at exit: 0 bytes in 0 blocks
```

```
==3648032== total heap usage: 25 allocs, 25 frees, 987,674 bytes allocated
```

```
==3648032==
```

```
==3648032== All heap blocks were freed -- no leaks are possible
```

```
==3648032==
```

```
==3648032== For counts of detected and suppressed errors, rerun with: -v
```

```
==3648032== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
```


Λειτουργία 6:

```
103ws19:/home/students/cs/2019/mvasil17/EPL232/Homework4>valgrind --tool=memcheck --leak-check=full --show-reachable=yes --num-callers=20 --track-fds=yes --track-origins=yes  
./bmpSteganography -decodeText new-tux-bonaparte.bmp 280 new-poem.txt
```

```
==3670439== Memcheck, a memory error detector
```

```
==3670439== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
```

```
==3670439== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
```

```
==3670439== Command: ./bmpSteganography -decodeText new-tux-bonaparte.bmp 280 new-poem.txt
```

```
==3670439==
```

```
Operation Successful==3670439==
```

```
==3670439== FILE DESCRIPTORS: 3 open at exit.
```

```
==3670439== Open file descriptor 2: /dev/pts/3
```

```
==3670439== <inherited from parent>
```

```
==3670439==
```

```
==3670439== Open file descriptor 1: /dev/pts/3
```

```
==3670439== <inherited from parent>
```

```
==3670439==
```

```
==3670439== Open file descriptor 0: /dev/pts/3
```

```
==3670439== <inherited from parent>
```

```
==3670439==
```

```
==3670439==
```

```
==3670439== HEAP SUMMARY:
```

```
==3670439== in use at exit: 0 bytes in 0 blocks
```

```
==3670439== total heap usage: 4 allocs, 4 frees, 984,176 bytes allocated
```

```
==3670439==
```

```
==3670439== All heap blocks were freed -- no leaks are possible
```

```
==3670439==
```

```
==3670439== For counts of detected and suppressed errors, rerun with: -v
```

```
==3670439== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
```

Λειτουργία 7:

```
103ws19:/home/students/cs/2019/mvasil17/EPL232/Homework4>valgrind --tool=memcheck --leak-check=full --show-reachable=yes --num-callers=20 --track-fds=yes --track-origins=yes  
./bmpSteganography -stringToImage tux-pirate.bmp strFile.txt
```

```
==3700113== Memcheck, a memory error detector
```

```
==3700113== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
```

```
==3700113== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
```

```
==3700113== Command: ./bmpSteganography -stringToImage tux-pirate.bmp strFile.txt
```

```
==3700113==
```

```
Operation Successful==3700113==
```

```
==3700113== FILE DESCRIPTORS: 3 open at exit.
```

```
==3700113== Open file descriptor 2: /dev/pts/3
```

```
==3700113==   <inherited from parent>
```

```
==3700113==
```

```
==3700113== Open file descriptor 1: /dev/pts/3
```

```
==3700113==   <inherited from parent>
```

```
==3700113==
```

```
==3700113== Open file descriptor 0: /dev/pts/3
```

```
==3700113==   <inherited from parent>
```

```
==3700113==
```

```
==3700113==
```

```
==3700113== HEAP SUMMARY:
```

```
==3700113==   in use at exit: 0 bytes in 0 blocks
```

```
==3700113== total heap usage: 10 allocs, 10 frees, 461,587 bytes allocated
```

```
==3700113==
```

```
==3700113== All heap blocks were freed -- no leaks are possible
```

```
==3700113==
```

```
==3700113== For counts of detected and suppressed errors, rerun with: -v
```

```
==3700113== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
```

Λειτουργία 8:

```
103ws19:/home/students/cs/2019/mvasil17/EPL232/Homework4>valgrind --tool=memcheck --leak-
check=full --show-reachable=yes --num-callers=20 --track-fds=yes --track-origins=yes
./bmpSteganography -imageToString encryptedTextImage.bmp
```

```
==3691313== Memcheck, a memory error detector
```

```
==3691313== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
```

```
==3691313== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
```

```
==3691313== Command: ./bmpSteganography -imageToString encryptedTextImage.bmp
```

```
==3691313==
```

```
==3691313== Conditional jump or move depends on uninitialised value(s)
```

```
==3691313==   at 0x402E93: ImageToString (in
/home/students/cs/2019/mvasil17/EPL232/Homework4/bmpSteganography)
```

```
==3691313==   by 0x4016B0: main (in
/home/students/cs/2019/mvasil17/EPL232/Homework4/bmpSteganography)
```

```
==3691313== Uninitialised value was created by a stack allocation
```

```
==3691313==   at 0x400AE1: main (in
/home/students/cs/2019/mvasil17/EPL232/Homework4/bmpSteganography)
```

```
==3691313==
```

```
Operation Successful==3691313==
```

```
==3691313== FILE DESCRIPTORS: 3 open at exit.
```

```
==3691313== Open file descriptor 2: /dev/pts/3
```

```
==3691313==   <inherited from parent>
```

```
==3691313==
```

```
==3691313== Open file descriptor 1: /dev/pts/3
```

```
==3691313==   <inherited from parent>
```

```
==3691313==
```

```
==3691313== Open file descriptor 0: /dev/pts/3
```

```
==3691313==   <inherited from parent>
```

```
==3691313==
```

```
==3691313==
```

```
==3691313== HEAP SUMMARY:
```

```
==3691313==   in use at exit: 0 bytes in 0 blocks
```

==3691313== total heap usage: 2 allocs, 2 frees, 1,136 bytes allocated

==3691313==

==3691313== All heap blocks were freed -- no leaks are possible

==3691313==

==3691313== For counts of detected and suppressed errors, rerun with: -v

==3691313== ERROR SUMMARY: 1 errors from 1 contexts (suppressed: 0 from 0)

Λειτουργία 9:

```
103ws19:/home/students/cs/2019/mvasil17/EPL232/Homework4>valgrind --tool=memcheck --leak-check=full --show-reachable=yes --num-callers=20 --track-fds=yes --track-origins=yes  
./bmpSteganography -negativeFilter image1.bmp
```

```
==3702612== Memcheck, a memory error detector
```

```
==3702612== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
```

```
==3702612== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
```

```
==3702612== Command: ./bmpSteganography -negativeFilter image1.bmp
```

```
==3702612==
```

```
Operation Successful==3702612==
```

```
==3702612== FILE DESCRIPTORS: 3 open at exit.
```

```
==3702612== Open file descriptor 2: /dev/pts/3
```

```
==3702612==   <inherited from parent>
```

```
==3702612==
```

```
==3702612== Open file descriptor 1: /dev/pts/3
```

```
==3702612==   <inherited from parent>
```

```
==3702612==
```

```
==3702612== Open file descriptor 0: /dev/pts/3
```

```
==3702612==   <inherited from parent>
```

```
==3702612==
```

```
==3702612==
```

```
==3702612== HEAP SUMMARY:
```

```
==3702612==   in use at exit: 0 bytes in 0 blocks
```

```
==3702612== total heap usage: 4 allocs, 4 frees, 1,166,636 bytes allocated
```

```
==3702612==
```

```
==3702612== All heap blocks were freed -- no leaks are possible
```

```
==3702612==
```

```
==3702612== For counts of detected and suppressed errors, rerun with: -v
```

```
==3702612== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
```