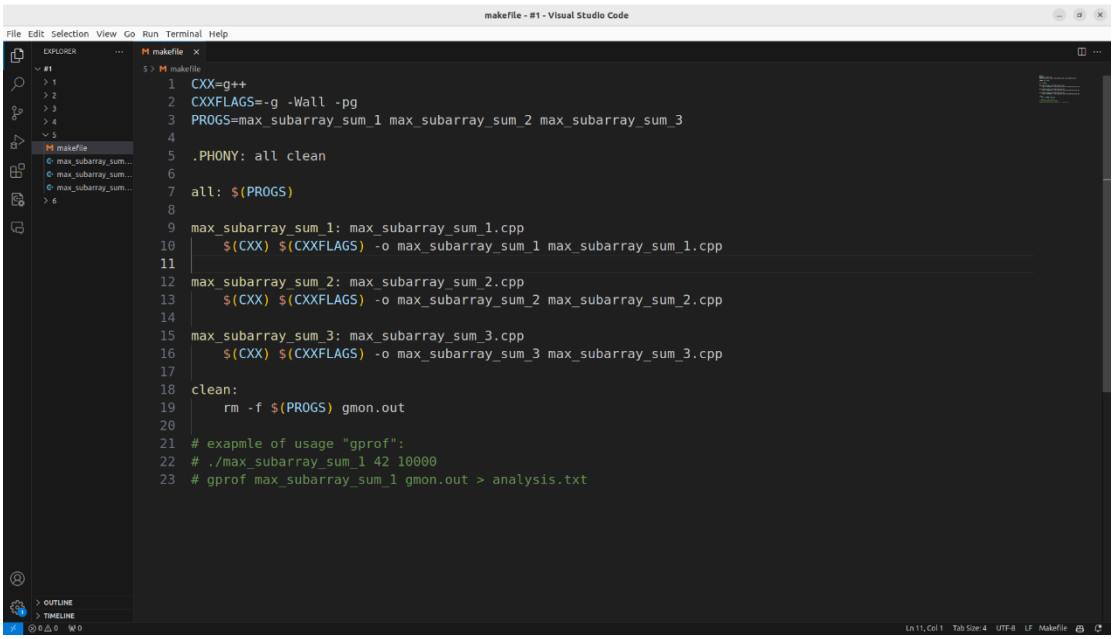
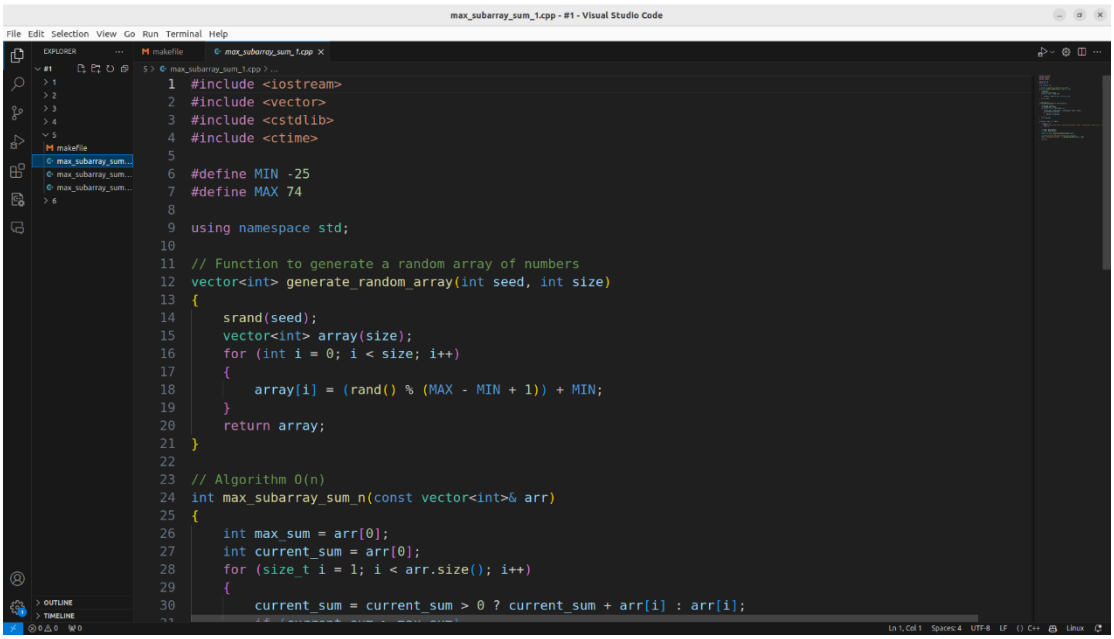
תרגיל 5 – תת מערך מקסימלי

מייקפייל:



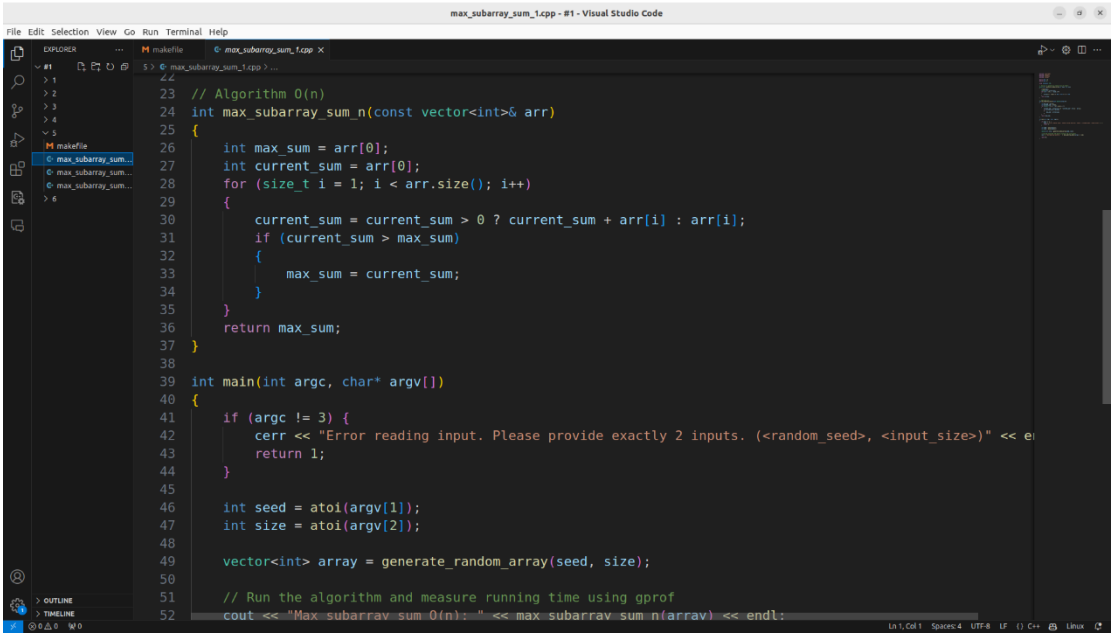
נראה צילום מסך של main: (כאן הmain מתייחס לmax_subarray_sum3 לצורך ההמחשה)

:Random seek

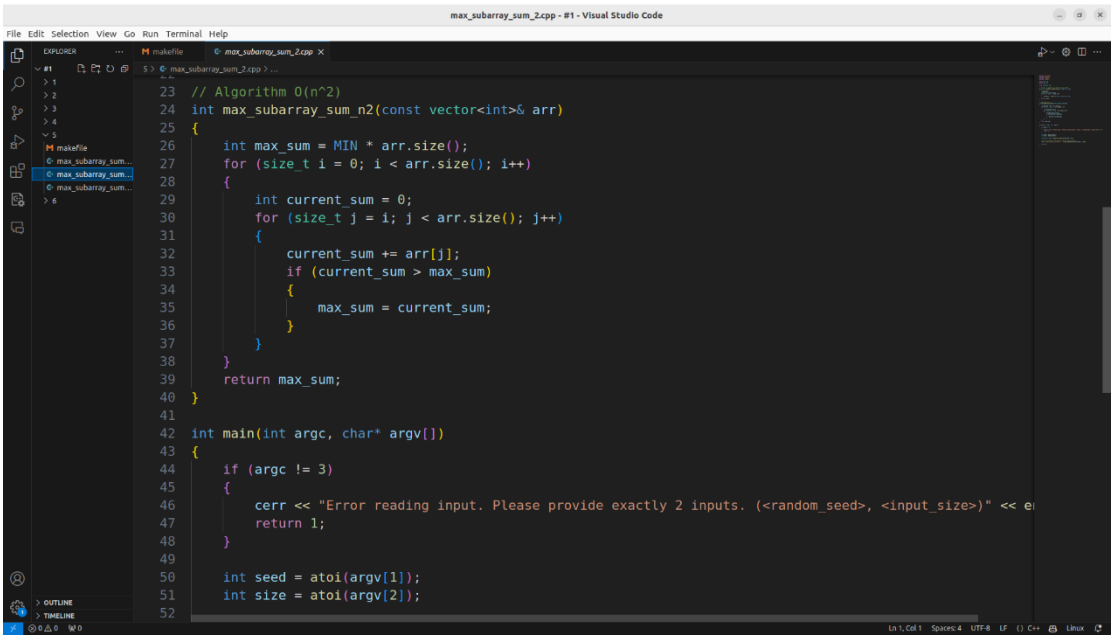


פונקציות למציאת תת מערך מקסימלי:

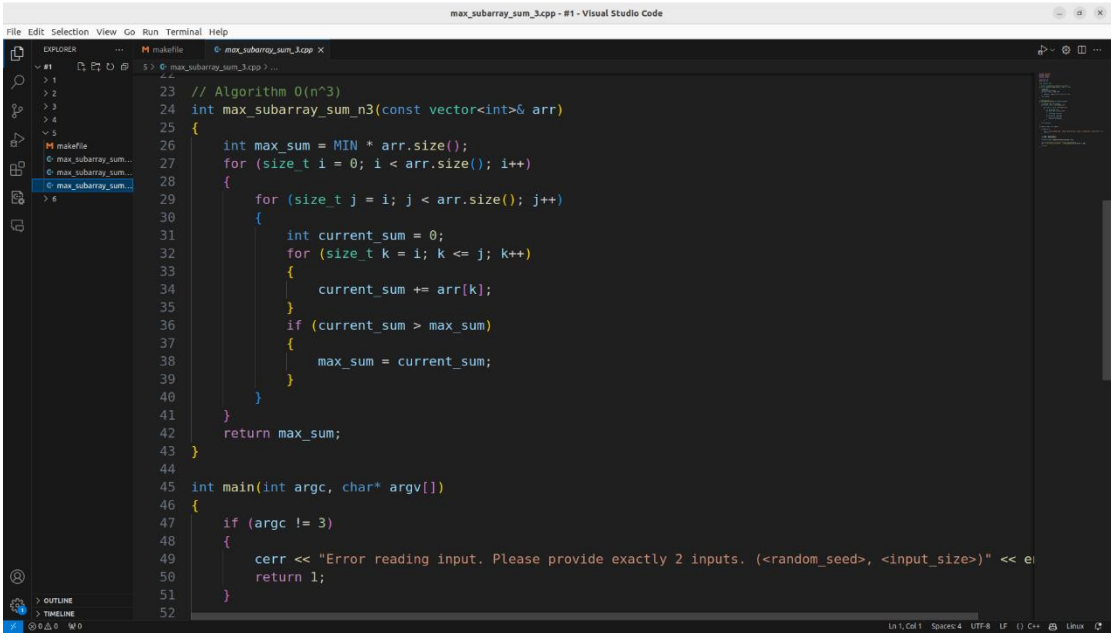
:O(n)



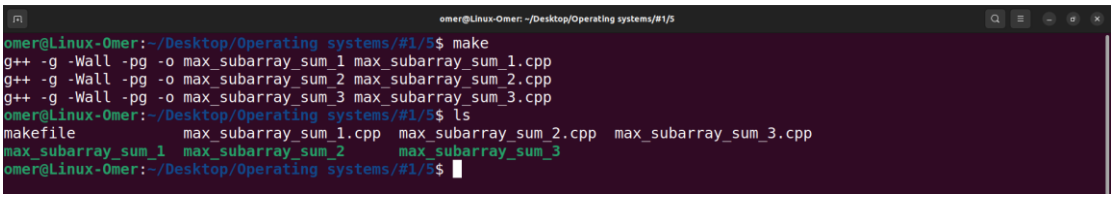
:O(n^2)

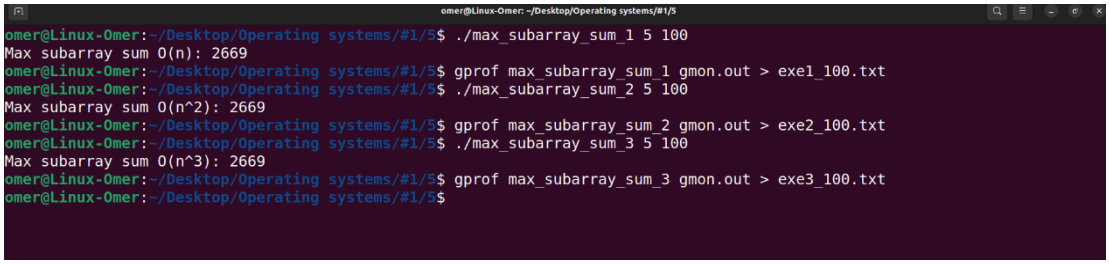

max_subarray_sum_2.cpp - #1 - Visual Studio Code
File Edit Selection View Go Run Terminal Help
EXPLORER
makefile
max_subarray_sum_2.cpp
// Algorithm O(n^2)
int max_subarray_sum_n2(const vector<int>& arr)
{
int max_sum = MIN * arr.size();
for (size_t i = 0; i < arr.size(); i++)
{
int current_sum = 0;
for (size_t j = i; j < arr.size(); j++)
{
current_sum += arr[j];
if (current_sum > max_sum)
{
max_sum = current_sum;
}
}
}
return max_sum;
}
int main(int argc, char* argv[])
{
if (argc != 3)
{
cerr << "Error reading input. Please provide exactly 2 inputs. (<random_seed>, <input_size>)" << e
return 1;
}
int seed = atoi(argv[1]);
int size = atoi(argv[2]);
OUTLINE
TIMELINE

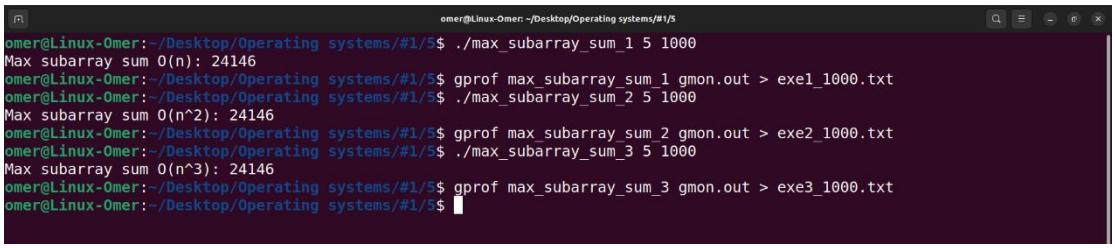
:O(n^3)

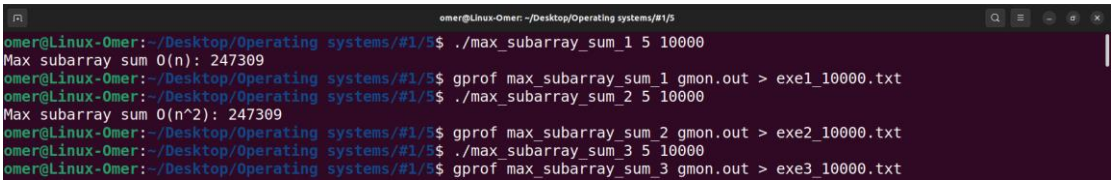

max_subarray_sum_3.cpp - #1 - Visual Studio Code
File Edit Selection View Go Run Terminal Help
EXPLORER
makefile
max_subarray_sum_3.cpp
// Algorithm O(n^3)
int max_subarray_sum_n3(const vector<int>& arr)
{
int max_sum = MIN * arr.size();
for (size_t i = 0; i < arr.size(); i++)
{
for (size_t j = i; j < arr.size(); j++)
{
int current_sum = 0;
for (size_t k = i; k <= j; k++)
{
current_sum += arr[k];
}
if (current_sum > max_sum)
{
max_sum = current_sum;
}
}
}
return max_sum;
}
int main(int argc, char* argv[])
{
if (argc != 3)
{
cerr << "Error reading input. Please provide exactly 2 inputs. (<random_seed>, <input_size>)" << e
return 1;
}
OUTLINE
TIMELINE

הרצת כל התוכניות לפי גודל 100 | 1000 | 10000:





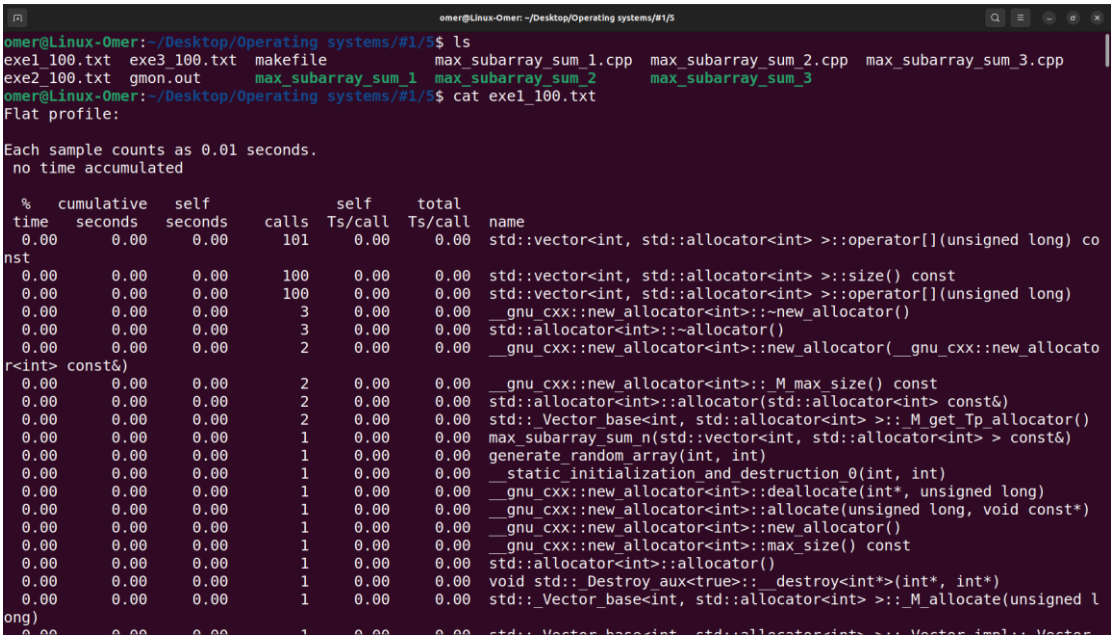


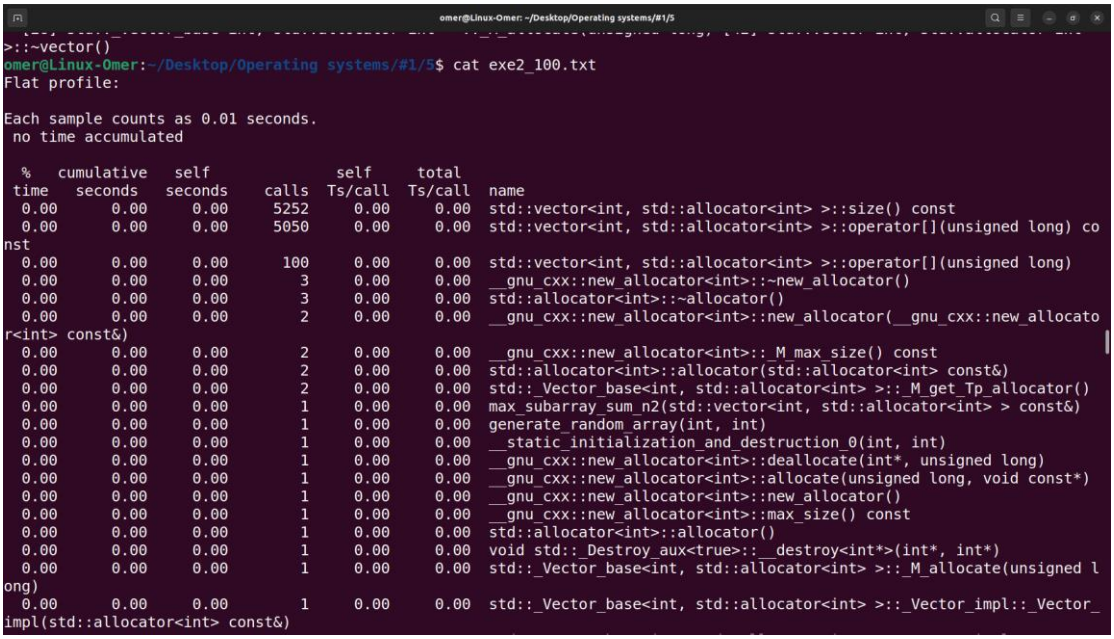


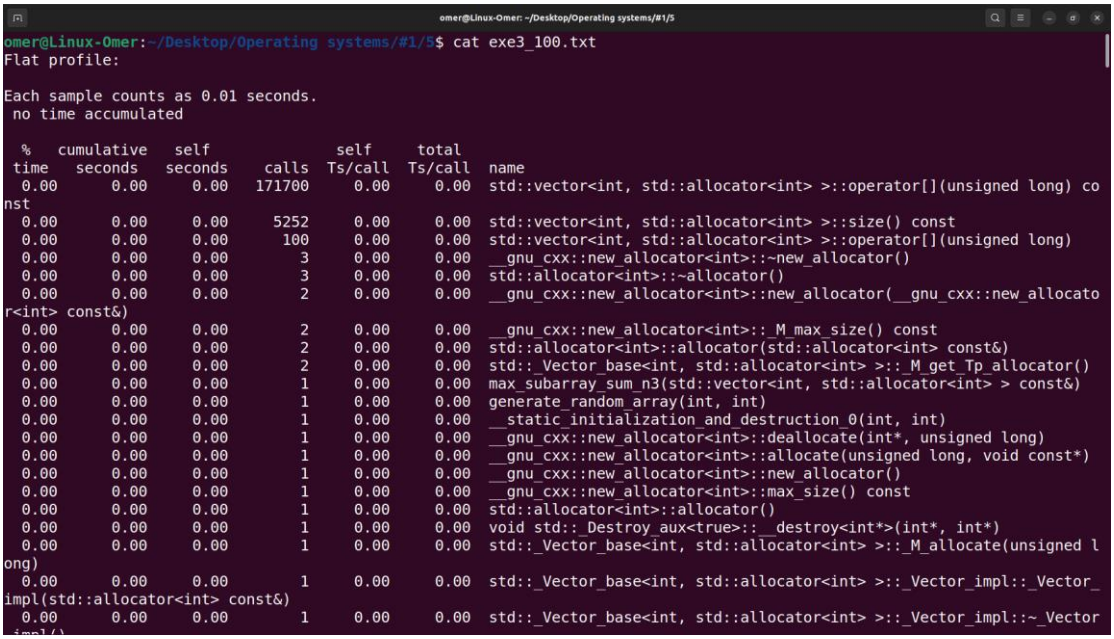
השוואות של exe1 exe2 exe3:

נתבונן בעמודה **cumulative** :
ניתן לראות את ההשפעה של יעילות של אלגוריתם שיכולה משמעותית להפחית את הזמן ריצה של פעולה מוסימת.

גודל 100: לפי סדר : n -> n^2 -> n^3

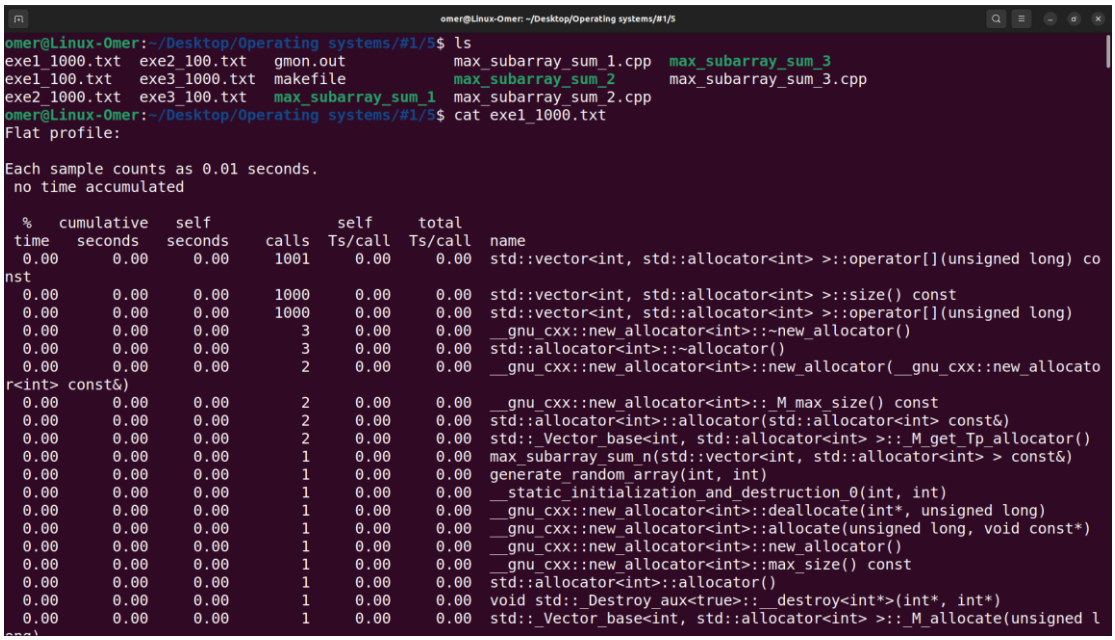



omer@Linux-Omer: ~/Desktop/Operating systems/#1/5
>::~vector()
omer@Linux-Omer:~/Desktop/Operating systems/#1/5$ cat exe2_100.txt
Flat profile:
Each sample counts as 0.01 seconds.
no time accumulated
% cumulative self self total
time seconds seconds calls Ts/call Ts/call name
0.00 0.00 0.00 5252 0.00 0.00 std::vector<int, std::allocator<int> >::size() const
0.00 0.00 0.00 5050 0.00 0.00 std::vector<int, std::allocator<int> >::operator[](unsigned long) co
nst
0.00 0.00 0.00 100 0.00 0.00 std::vector<int, std::allocator<int> >::operator[](unsigned long)
0.00 0.00 0.00 3 0.00 0.00 __gnu_cxx::new_allocator<int>::~new_allocator()
0.00 0.00 0.00 3 0.00 0.00 std::allocator<int>::~allocator()
0.00 0.00 0.00 2 0.00 0.00 __gnu_cxx::new_allocator<int>::new_allocator(__gnu_cxx::new_allocato
r<int> const&)
0.00 0.00 0.00 2 0.00 0.00 __gnu_cxx::new_allocator<int>::_M_max_size() const
0.00 0.00 0.00 2 0.00 0.00 std::allocator<int>::allocator(std::allocator<int> const&)
0.00 0.00 0.00 2 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_M_get_Tp_allocator()
0.00 0.00 0.00 1 0.00 0.00 max_subarray_sum_n2(std::vector<int, std::allocator<int> > const&)
0.00 0.00 0.00 1 0.00 0.00 generate_random_array(int, int)
0.00 0.00 0.00 1 0.00 0.00 __static_initialization_and_destruction_0(int, int)
0.00 0.00 0.00 1 0.00 0.00 __gnu_cxx::new_allocator<int>::deallocate(int*, unsigned long)
0.00 0.00 0.00 1 0.00 0.00 __gnu_cxx::new_allocator<int>::allocate(unsigned long, void const*)
0.00 0.00 0.00 1 0.00 0.00 __gnu_cxx::new_allocator<int>::new_allocator()
0.00 0.00 0.00 1 0.00 0.00 __gnu_cxx::new_allocator<int>::max_size() const
0.00 0.00 0.00 1 0.00 0.00 std::allocator<int>::allocator()
0.00 0.00 0.00 1 0.00 0.00 void std::_Destroy_aux<true>::__destroy<int*>(int*, int*)
0.00 0.00 0.00 1 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_M_allocate(unsigned l
ong)
0.00 0.00 0.00 1 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_Vector_impl::_Vector_
impl(std::allocator<int> const&)

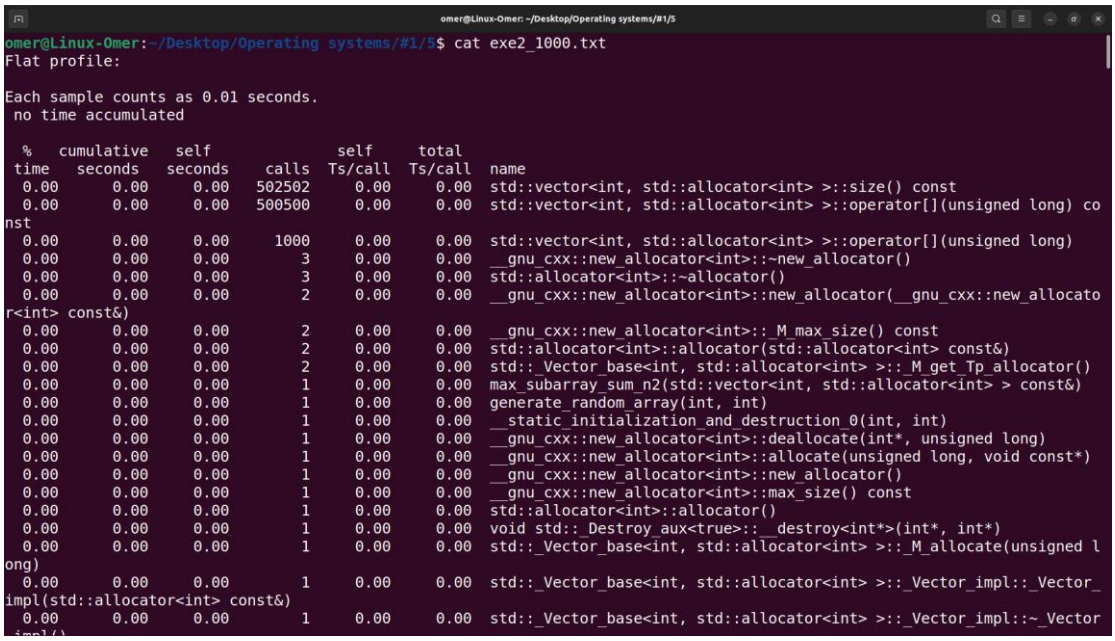

omer@Linux-Omer: ~/Desktop/Operating systems/#1/5
omer@Linux-Omer:~/Desktop/Operating systems/#1/5$ cat exe3_100.txt
Flat profile:
Each sample counts as 0.01 seconds.
no time accumulated
% cumulative self self total
time seconds seconds calls Ts/call Ts/call name
0.00 0.00 0.00 171700 0.00 0.00 std::vector<int, std::allocator<int> >::operator[](unsigned long) co
nst
0.00 0.00 0.00 5252 0.00 0.00 std::vector<int, std::allocator<int> >::size() const
0.00 0.00 0.00 100 0.00 0.00 std::vector<int, std::allocator<int> >::operator[](unsigned long)
0.00 0.00 0.00 3 0.00 0.00 __gnu_cxx::new_allocator<int>::~new_allocator()
0.00 0.00 0.00 3 0.00 0.00 std::allocator<int>::~allocator()
0.00 0.00 0.00 2 0.00 0.00 __gnu_cxx::new_allocator<int>::new_allocator(__gnu_cxx::new_allocato
r<int> const&)
0.00 0.00 0.00 2 0.00 0.00 __gnu_cxx::new_allocator<int>::_M_max_size() const
0.00 0.00 0.00 2 0.00 0.00 std::allocator<int>::allocator(std::allocator<int> const&)
0.00 0.00 0.00 2 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_M_get_Tp_allocator()
0.00 0.00 0.00 1 0.00 0.00 max_subarray_sum_n3(std::vector<int, std::allocator<int> > const&)
0.00 0.00 0.00 1 0.00 0.00 generate_random_array(int, int)
0.00 0.00 0.00 1 0.00 0.00 __static_initialization_and_destruction_0(int, int)
0.00 0.00 0.00 1 0.00 0.00 __gnu_cxx::new_allocator<int>::deallocate(int*, unsigned long)
0.00 0.00 0.00 1 0.00 0.00 __gnu_cxx::new_allocator<int>::allocate(unsigned long, void const*)
0.00 0.00 0.00 1 0.00 0.00 __gnu_cxx::new_allocator<int>::new_allocator()
0.00 0.00 0.00 1 0.00 0.00 __gnu_cxx::new_allocator<int>::max_size() const
0.00 0.00 0.00 1 0.00 0.00 std::allocator<int>::allocator()
0.00 0.00 0.00 1 0.00 0.00 void std::_Destroy_aux<true>::__destroy<int*>(int*, int*)
0.00 0.00 0.00 1 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_M_allocate(unsigned l
ong)
0.00 0.00 0.00 1 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_Vector_impl::_Vector_
impl(std::allocator<int> const&)
0.00 0.00 0.00 1 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_Vector_impl::~_Vector

השוואות של exe1 exe2 exe3:

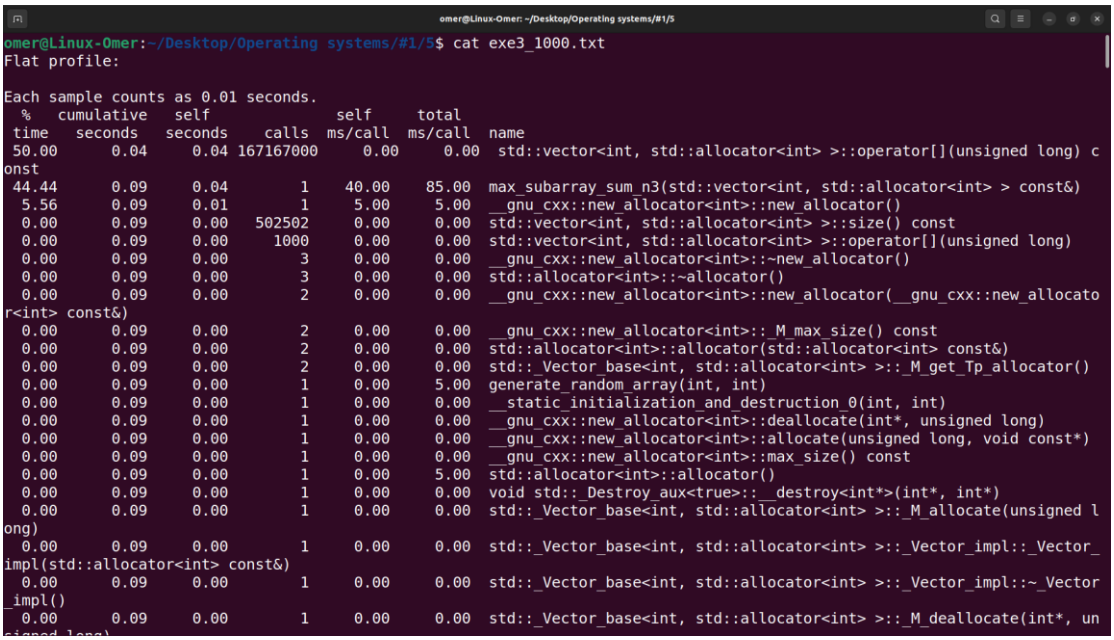
גודל 1000: לפי סדר : n -> n^2 -> n^3



```
omer@Linux-Omer:~/Desktop/Operating systems/#1/5$ ls
exe1_1000.txt  exe2_100.txt   gmon.out            max_subarray_sum_1.cpp  max_subarray_sum_3
exe1_100.txt   exe3_1000.txt  makefile            max_subarray_sum_2      max_subarray_sum_3.cpp
exe2_1000.txt  exe3_100.txt   max_subarray_sum_1  max_subarray_sum_2.cpp
omer@Linux-Omer:~/Desktop/Operating systems/#1/5$ cat exe1_1000.txt
Flat profile:

Each sample counts as 0.01 seconds.
 no time accumulated

  %   cumulative   self              self     total
 time   seconds   seconds    calls  Ts/call  Ts/call  name
  0.00      0.00     0.00     1001     0.00     0.00  std::vector<int, std::allocator<int> >::operator[](unsigned long) co
nst
  0.00      0.00     0.00     1000     0.00     0.00  std::vector<int, std::allocator<int> >::size() const
  0.00      0.00     0.00     1000     0.00     0.00  std::vector<int, std::allocator<int> >::operator[](unsigned long)
  0.00      0.00     0.00        3     0.00     0.00  __gnu_cxx::new_allocator<int>::~new_allocator()
  0.00      0.00     0.00        3     0.00     0.00  std::allocator<int>::~allocator()
  0.00      0.00     0.00        2     0.00     0.00  __gnu_cxx::new_allocator<int>::new_allocator(__gnu_cxx::new_allocato
r<int> const&)
  0.00      0.00     0.00        2     0.00     0.00  __gnu_cxx::new_allocator<int>::_M_max_size() const
  0.00      0.00     0.00        2     0.00     0.00  std::allocator<int>::allocator(std::allocator<int> const&)
  0.00      0.00     0.00        2     0.00     0.00  std::_Vector_base<int, std::allocator<int> >::_M_get_Tp_allocator()
  0.00      0.00     0.00        1     0.00     0.00  max_subarray_sum_n(std::vector<int, std::allocator<int> > const&)
  0.00      0.00     0.00        1     0.00     0.00  generate_random_array(int, int)
  0.00      0.00     0.00        1     0.00     0.00  __static_initialization_and_destruction_0(int, int)
  0.00      0.00     0.00        1     0.00     0.00  __gnu_cxx::new_allocator<int>::deallocate(int*, unsigned long)
  0.00      0.00     0.00        1     0.00     0.00  __gnu_cxx::new_allocator<int>::allocate(unsigned long, void const*)
  0.00      0.00     0.00        1     0.00     0.00  __gnu_cxx::new_allocator<int>::new_allocator()
  0.00      0.00     0.00        1     0.00     0.00  __gnu_cxx::new_allocator<int>::max_size() const
  0.00      0.00     0.00        1     0.00     0.00  std::allocator<int>::allocator()
  0.00      0.00     0.00        1     0.00     0.00  void std::_Destroy_aux<true>::__destroy<int*>(int*, int*)
  0.00      0.00     0.00        1     0.00     0.00  std::_Vector_base<int, std::allocator<int> >::_M_allocate(unsigned l
ong)
```

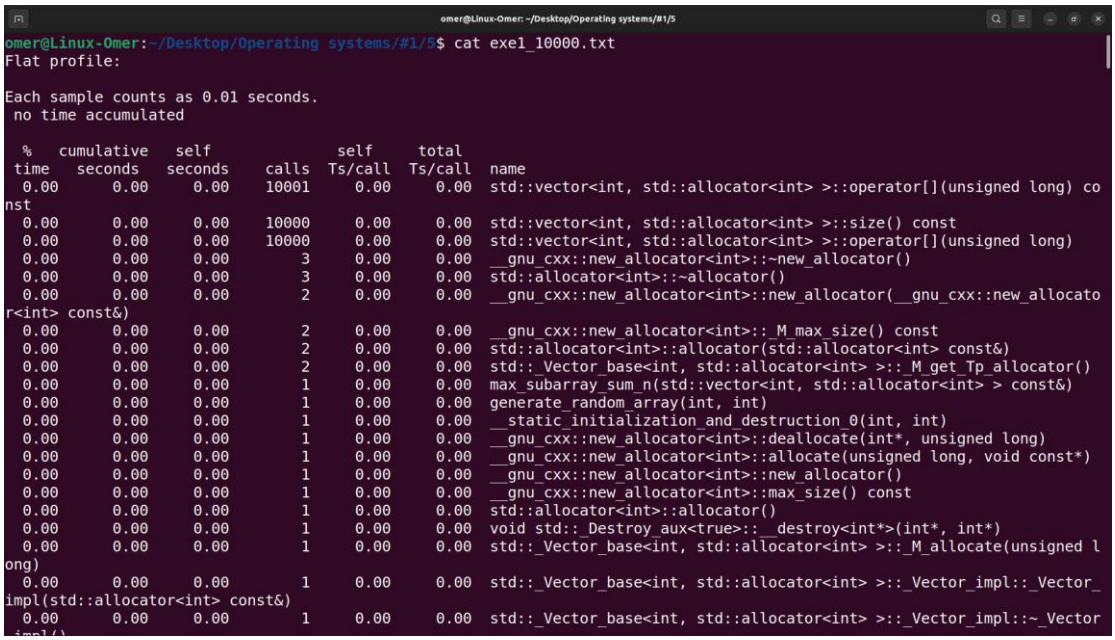


```
omer@Linux-Omer:~/Desktop/Operating systems/#1/5$ cat exe2_1000.txt
Flat profile:

Each sample counts as 0.01 seconds.
 no time accumulated

  %   cumulative   self              self     total
 time   seconds   seconds    calls  Ts/call  Ts/call  name
  0.00      0.00     0.00   502502     0.00     0.00  std::vector<int, std::allocator<int> >::size() const
  0.00      0.00     0.00   500500     0.00     0.00  std::vector<int, std::allocator<int> >::operator[](unsigned long) co
nst
  0.00      0.00     0.00     1000     0.00     0.00  std::vector<int, std::allocator<int> >::operator[](unsigned long)
  0.00      0.00     0.00        3     0.00     0.00  __gnu_cxx::new_allocator<int>::~new_allocator()
  0.00      0.00     0.00        3     0.00     0.00  std::allocator<int>::~allocator()
  0.00      0.00     0.00        2     0.00     0.00  __gnu_cxx::new_allocator<int>::new_allocator(__gnu_cxx::new_allocato
r<int> const&)
  0.00      0.00     0.00        2     0.00     0.00  __gnu_cxx::new_allocator<int>::_M_max_size() const
  0.00      0.00     0.00        2     0.00     0.00  std::allocator<int>::allocator(std::allocator<int> const&)
  0.00      0.00     0.00        2     0.00     0.00  std::_Vector_base<int, std::allocator<int> >::_M_get_Tp_allocator()
  0.00      0.00     0.00        1     0.00     0.00  max_subarray_sum_n2(std::vector<int, std::allocator<int> > const&)
  0.00      0.00     0.00        1     0.00     0.00  generate_random_array(int, int)
  0.00      0.00     0.00        1     0.00     0.00  __static_initialization_and_destruction_0(int, int)
  0.00      0.00     0.00        1     0.00     0.00  __gnu_cxx::new_allocator<int>::deallocate(int*, unsigned long)
  0.00      0.00     0.00        1     0.00     0.00  __gnu_cxx::new_allocator<int>::allocate(unsigned long, void const*)
  0.00      0.00     0.00        1     0.00     0.00  __gnu_cxx::new_allocator<int>::new_allocator()
  0.00      0.00     0.00        1     0.00     0.00  __gnu_cxx::new_allocator<int>::max_size() const
  0.00      0.00     0.00        1     0.00     0.00  std::allocator<int>::allocator()
  0.00      0.00     0.00        1     0.00     0.00  void std::_Destroy_aux<true>::__destroy<int*>(int*, int*)
  0.00      0.00     0.00        1     0.00     0.00  std::_Vector_base<int, std::allocator<int> >::_M_allocate(unsigned l
ong)
  0.00      0.00     0.00        1     0.00     0.00  std::_Vector_base<int, std::allocator<int> >::_Vector_impl::_Vector_
impl(std::allocator<int> const&)
  0.00      0.00     0.00        1     0.00     0.00  std::_Vector_base<int, std::allocator<int> >::_Vector_impl::~_Vector
```

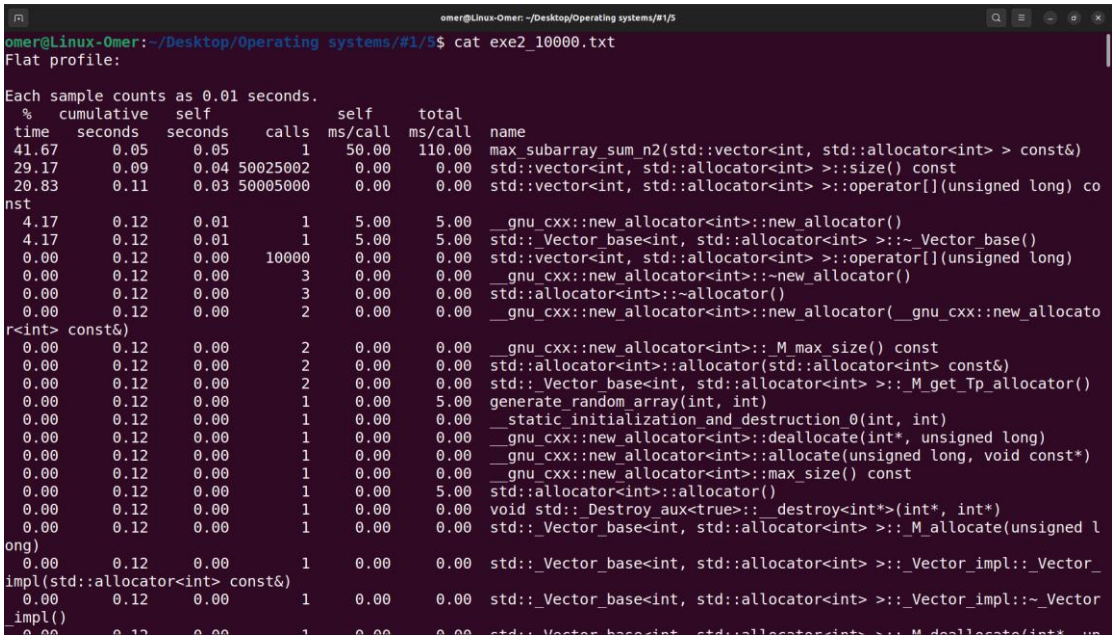

omer@Linux-Omer: ~/Desktop/Operating systems/#1/5
omer@Linux-Omer:~/Desktop/Operating systems/#1/5$ cat exe3_1000.txt
Flat profile:
Each sample counts as 0.01 seconds.
% cumulative self self total
time seconds seconds calls ms/call ms/call name
50.00 0.04 0.04 167167000 0.00 0.00 std::vector<int, std::allocator<int> >::operator[](unsigned long) c
onst
44.44 0.09 0.04 1 40.00 85.00 max_subarray_sum_n3(std::vector<int, std::allocator<int> > const&)
5.56 0.09 0.01 1 5.00 5.00 __gnu_cxx::new_allocator<int>::new_allocator()
0.00 0.09 0.00 502502 0.00 0.00 std::vector<int, std::allocator<int> >::size() const
0.00 0.09 0.00 1000 0.00 0.00 std::vector<int, std::allocator<int> >::operator[](unsigned long)
0.00 0.09 0.00 3 0.00 0.00 __gnu_cxx::new_allocator<int>::~new_allocator()
0.00 0.09 0.00 3 0.00 0.00 std::allocator<int>::~allocator()
0.00 0.09 0.00 2 0.00 0.00 __gnu_cxx::new_allocator<int>::new_allocator(__gnu_cxx::new_allocato
r<int> const&)
0.00 0.09 0.00 2 0.00 0.00 __gnu_cxx::new_allocator<int>::_M_max_size() const
0.00 0.09 0.00 2 0.00 0.00 std::allocator<int>::allocator(std::allocator<int> const&)
0.00 0.09 0.00 2 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_M_get_Tp_allocator()
0.00 0.09 0.00 1 0.00 5.00 generate_random_array(int, int)
0.00 0.09 0.00 1 0.00 0.00 __static_initialization_and_destruction_0(int, int)
0.00 0.09 0.00 1 0.00 0.00 __gnu_cxx::new_allocator<int>::deallocate(int*, unsigned long)
0.00 0.09 0.00 1 0.00 0.00 __gnu_cxx::new_allocator<int>::allocate(unsigned long, void const*)
0.00 0.09 0.00 1 0.00 0.00 __gnu_cxx::new_allocator<int>::max_size() const
0.00 0.09 0.00 1 0.00 5.00 std::allocator<int>::allocator()
0.00 0.09 0.00 1 0.00 0.00 void std::_Destroy_aux<true>::__destroy<int*>(int*, int*)
0.00 0.09 0.00 1 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_M_allocate(unsigned l
ong)
0.00 0.09 0.00 1 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_Vector_impl::_Vector_
impl(std::allocator<int> const&)
0.00 0.09 0.00 1 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_Vector_impl::~_Vector
_impl()
0.00 0.09 0.00 1 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_M_deallocate(int*, un

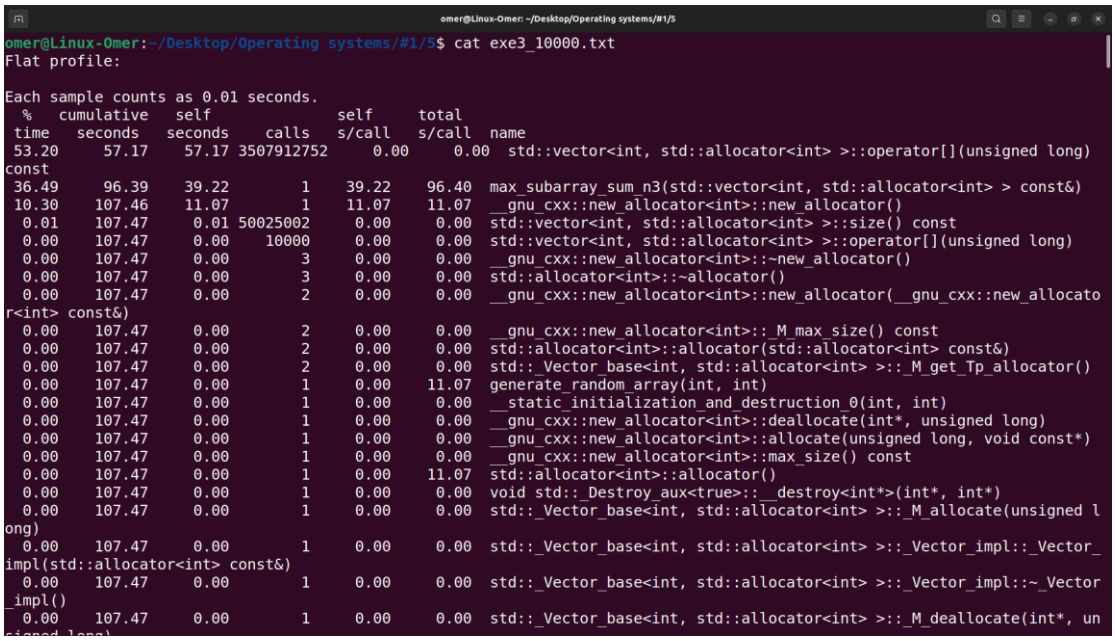
השוואות של exe1 exe2 exe3:

גודל 10000: לפי סדר : n -> n^2 -> n^3



```
omer@Linux-Omer: ~/Desktop/Operating systems/#1/5
omer@Linux-Omer:~/Desktop/Operating systems/#1/5$ cat exe1_10000.txt
Flat profile:

Each sample counts as 0.01 seconds.
 no time accumulated

  %   cumulative   self              self     total
 time   seconds   seconds    calls  Ts/call  Ts/call  name
  0.00      0.00     0.00    10001     0.00     0.00  std::vector<int, std::allocator<int> >::operator[](unsigned long) co
nst
  0.00      0.00     0.00    10000     0.00     0.00  std::vector<int, std::allocator<int> >::size() const
  0.00      0.00     0.00    10000     0.00     0.00  std::vector<int, std::allocator<int> >::operator[](unsigned long)
  0.00      0.00     0.00        3     0.00     0.00  __gnu_cxx::new_allocator<int>::~new_allocator()
  0.00      0.00     0.00        3     0.00     0.00  std::allocator<int>::~allocator()
  0.00      0.00     0.00        2     0.00     0.00  __gnu_cxx::new_allocator<int>::new_allocator(__gnu_cxx::new_allocato
r<int> const&)
  0.00      0.00     0.00        2     0.00     0.00  __gnu_cxx::new_allocator<int>::_M_max_size() const
  0.00      0.00     0.00        2     0.00     0.00  std::allocator<int>::allocator(std::allocator<int> const&)
  0.00      0.00     0.00        2     0.00     0.00  std::_Vector_base<int, std::allocator<int> >::_M_get_Tp_allocator()
  0.00      0.00     0.00        1     0.00     0.00  max_subarray_sum_n(std::vector<int, std::allocator<int> > const&)
  0.00      0.00     0.00        1     0.00     0.00  generate_random_array(int, int)
  0.00      0.00     0.00        1     0.00     0.00  __static_initialization_and_destruction_0(int, int)
  0.00      0.00     0.00        1     0.00     0.00  __gnu_cxx::new_allocator<int>::deallocate(int*, unsigned long)
  0.00      0.00     0.00        1     0.00     0.00  __gnu_cxx::new_allocator<int>::allocate(unsigned long, void const*)
  0.00      0.00     0.00        1     0.00     0.00  __gnu_cxx::new_allocator<int>::new_allocator()
  0.00      0.00     0.00        1     0.00     0.00  __gnu_cxx::new_allocator<int>::max_size() const
  0.00      0.00     0.00        1     0.00     0.00  std::allocator<int>::allocator()
  0.00      0.00     0.00        1     0.00     0.00  void std::_Destroy_aux<true>::__destroy<int*>(int*, int*)
  0.00      0.00     0.00        1     0.00     0.00  std::_Vector_base<int, std::allocator<int> >::_M_allocate(unsigned l
ong)
  0.00      0.00     0.00        1     0.00     0.00  std::_Vector_base<int, std::allocator<int> >::_Vector_impl::_Vector_
impl(std::allocator<int> const&)
  0.00      0.00     0.00        1     0.00     0.00  std::_Vector_base<int, std::allocator<int> >::_Vector_impl::~_Vector
 impl()
```


omer@Linux-Omer: ~/Desktop/Operating systems/#1/5
omer@Linux-Omer:~/Desktop/Operating systems/#1/5$ cat exe2_10000.txt
Flat profile:
Each sample counts as 0.01 seconds.
% cumulative self self total
time seconds seconds calls ms/call ms/call name
41.67 0.05 0.05 1 50.00 110.00 max_subarray_sum_n2(std::vector<int, std::allocator<int> > const&)
29.17 0.09 0.04 50025002 0.00 0.00 std::vector<int, std::allocator<int> >::size() const
20.83 0.11 0.03 50005000 0.00 0.00 std::vector<int, std::allocator<int> >::operator[](unsigned long) co
nst
4.17 0.12 0.01 1 5.00 5.00 __gnu_cxx::new_allocator<int>::new_allocator()
4.17 0.12 0.01 1 5.00 5.00 std::_Vector_base<int, std::allocator<int> >::~_Vector_base()
0.00 0.12 0.00 10000 0.00 0.00 std::vector<int, std::allocator<int> >::operator[](unsigned long)
0.00 0.12 0.00 3 0.00 0.00 __gnu_cxx::new_allocator<int>::~new_allocator()
0.00 0.12 0.00 3 0.00 0.00 std::allocator<int>::~allocator()
0.00 0.12 0.00 2 0.00 0.00 __gnu_cxx::new_allocator<int>::new_allocator(__gnu_cxx::new_allocato
r<int> const&)
0.00 0.12 0.00 2 0.00 0.00 __gnu_cxx::new_allocator<int>::_M_max_size() const
0.00 0.12 0.00 2 0.00 0.00 std::allocator<int>::allocator(std::allocator<int> const&)
0.00 0.12 0.00 2 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_M_get_Tp_allocator()
0.00 0.12 0.00 1 0.00 5.00 generate_random_array(int, int)
0.00 0.12 0.00 1 0.00 0.00 __static_initialization_and_destruction_0(int, int)
0.00 0.12 0.00 1 0.00 0.00 __gnu_cxx::new_allocator<int>::deallocate(int*, unsigned long)
0.00 0.12 0.00 1 0.00 0.00 __gnu_cxx::new_allocator<int>::allocate(unsigned long, void const*)
0.00 0.12 0.00 1 0.00 0.00 __gnu_cxx::new_allocator<int>::max_size() const
0.00 0.12 0.00 1 0.00 5.00 std::allocator<int>::allocator()
0.00 0.12 0.00 1 0.00 0.00 void std::_Destroy_aux<true>::__destroy<int*>(int*, int*)
0.00 0.12 0.00 1 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_M_allocate(unsigned l
ong)
0.00 0.12 0.00 1 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_Vector_impl::_Vector_
impl(std::allocator<int> const&)
0.00 0.12 0.00 1 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_Vector_impl::~_Vector
_impl()


omer@Linux-Omer: ~/Desktop/Operating systems/#1/5
omer@Linux-Omer:~/Desktop/Operating systems/#1/5$ cat exe3_10000.txt
Flat profile:
Each sample counts as 0.01 seconds.
% cumulative self self total
time seconds seconds calls s/call s/call name
53.20 57.17 57.17 3507912752 0.00 0.00 std::vector<int, std::allocator<int> >::operator[](unsigned long)
const
36.49 96.39 39.22 1 39.22 96.40 max_subarray_sum_n3(std::vector<int, std::allocator<int> > const&)
10.30 107.46 11.07 1 11.07 11.07 __gnu_cxx::new_allocator<int>::new_allocator()
0.01 107.47 0.01 50025002 0.00 0.00 std::vector<int, std::allocator<int> >::size() const
0.00 107.47 0.00 10000 0.00 0.00 std::vector<int, std::allocator<int> >::operator[](unsigned long)
0.00 107.47 0.00 3 0.00 0.00 __gnu_cxx::new_allocator<int>::~new_allocator()
0.00 107.47 0.00 3 0.00 0.00 std::allocator<int>::~allocator()
0.00 107.47 0.00 2 0.00 0.00 __gnu_cxx::new_allocator<int>::new_allocator(__gnu_cxx::new_allocato
r<int> const&)
0.00 107.47 0.00 2 0.00 0.00 __gnu_cxx::new_allocator<int>::_M_max_size() const
0.00 107.47 0.00 2 0.00 0.00 std::allocator<int>::allocator(std::allocator<int> const&)
0.00 107.47 0.00 2 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_M_get_Tp_allocator()
0.00 107.47 0.00 1 0.00 11.07 generate_random_array(int, int)
0.00 107.47 0.00 1 0.00 0.00 __static_initialization_and_destruction_0(int, int)
0.00 107.47 0.00 1 0.00 0.00 __gnu_cxx::new_allocator<int>::deallocate(int*, unsigned long)
0.00 107.47 0.00 1 0.00 0.00 __gnu_cxx::new_allocator<int>::allocate(unsigned long, void const*)
0.00 107.47 0.00 1 0.00 0.00 __gnu_cxx::new_allocator<int>::max_size() const
0.00 107.47 0.00 1 0.00 11.07 std::allocator<int>::allocator()
0.00 107.47 0.00 1 0.00 0.00 void std::_Destroy_aux<true>::__destroy<int*>(int*, int*)
0.00 107.47 0.00 1 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_M_allocate(unsigned l
ong)
0.00 107.47 0.00 1 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_Vector_impl::_Vector_
impl(std::allocator<int> const&)
0.00 107.47 0.00 1 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_Vector_impl::~_Vector
_impl()
0.00 107.47 0.00 1 0.00 0.00 std::_Vector_base<int, std::allocator<int> >::_M_deallocate(int*, un