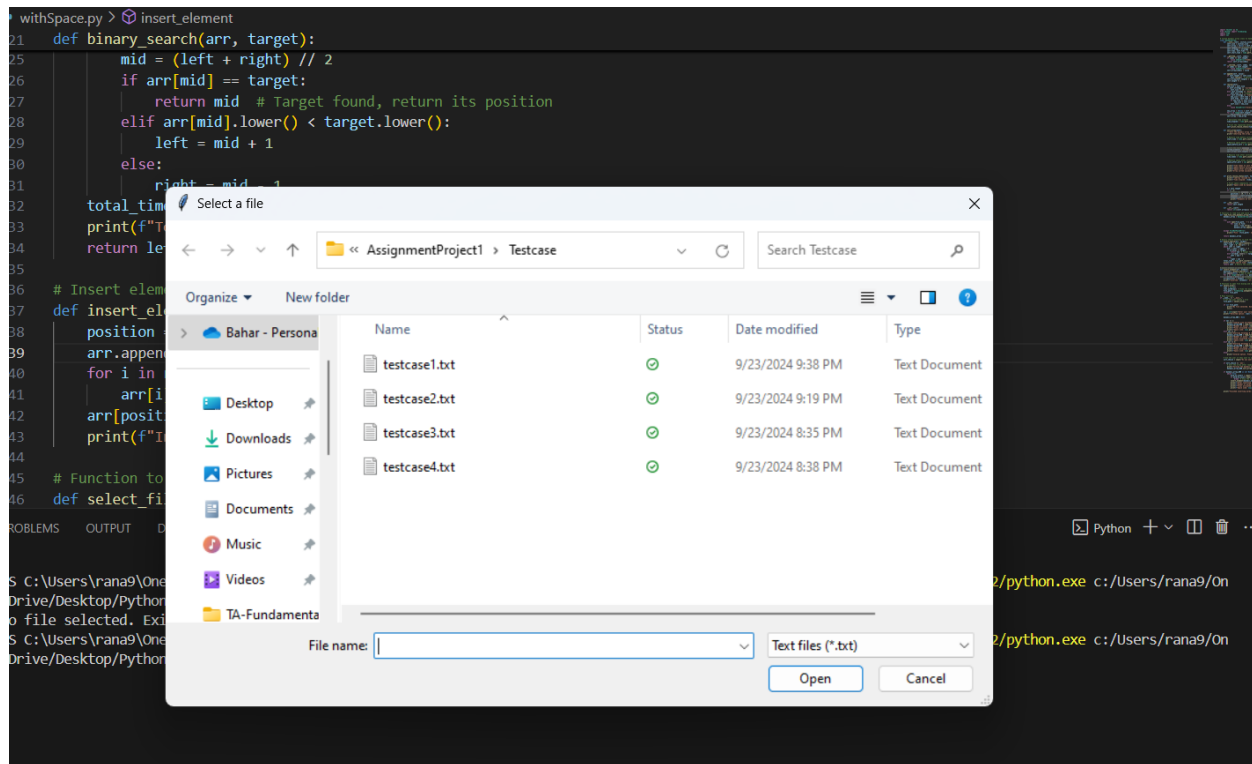


Input Output File

A prompt will open when the program runs. Users select an input file from the computer.



Step 1: After selecting the file, the user can select in which way he wants to create dynamic array. There are 3 strategies such as Incremental=1, Doubling=2 and Fibonacci=3. User can enter the value and according to his input dynamic array will be created.

Step 2: If user wants to sort the array, then user can enter the value = yes

If the array is already sorted, then enter the value = no

Step 3: If you want to insert new value into dynamic array then enter a value that will be inserted into correct position

Testcase 1: (Incremental)

Input file contains 50 words

Output:

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
PS C:\Users\rana9\OneDrive\Desktop\Python_Program\AssignmentProject1> & C:/Users/rana9/AppData/Local/Programs/Python/Python312/python.exe c:/Users/rana9/OneDrive/Desktop/Python_Program/AssignmentProject1/withSpace.py
Enter your value (1 for Incremental, 2 for Doubling, 3 for Fibonacci): 1
Selected option: 1
Loading with Incremental Resizing:

Array resized to: 12
Time elapsed: 0.000346900 seconds
Space used by dynamic array: 152 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: babishness->babishness->babysit->babysit->babysit

Array resized to: 22
Time elapsed: 0.002016400 seconds
Space used by dynamic array: 232 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: babishness->babysitter->baby-sitting->baby-snatching->Babist

Array resized to: 32
Time elapsed: 0.003556400 seconds
Space used by dynamic array: 312 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: babishness->babysitting->Babist->chimereal->chimereal

Array resized to: 42
Time elapsed: 0.004827200 seconds
Space used by dynamic array: 392 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: babishness->Babism->chimereal->chimerism->chymic

Array resized to: 52
Time elapsed: 0.006180000 seconds
Space used by dynamic array: 472 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: babishness->baby's-slippers->chimereal->chymic->Chimique
Number of words: 50
Final allocated size: 52
Space used: 472 bytes
Do you want to sort the array? (yes/no): yes
Sorting the dynamic array...
```

Continuing the screenshot

```
Final allocated size: 52
Space used: 472 bytes
Do you want to sort the array? (yes/no): yes
Sorting the dynamic array...
Time taken to sort the array: 0.000031200 seconds
Space before sorting: 456 bytes
Space after sorting: 456 bytes
Array sorted successfully.
Enter a word to insert (or type 'done' to finish): backbit
Total search time: 0.000039100 seconds
Inserted 'backbit' at position 16.
After inserting 'backbit':
Number of words: 51
Final allocated size: 52
Space used: 472 bytes
Enter a word to insert (or type 'done' to finish): backbend
Total search time: 0.000028900 seconds
Inserted 'backbend' at position 16.
After inserting 'backbend':
Number of words: 52
Final allocated size: 52
Space used: 472 bytes
Enter a word to insert (or type 'done' to finish): backbiter
Total search time: 0.000010700 seconds

Array resized to: 62
Time elapsed: 204.809457900 seconds
Space used by dynamic array: 552 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: Babism->babysit->chimereal->chimneyman->chymists
Inserted 'backbiter' at position 18.
After inserting 'backbiter':
Number of words: 53
Final allocated size: 62
Space used: 552 bytes
Enter a word to insert (or type 'done' to finish): done
Finished inserting words.
PS C:\Users\rana9\OneDrive\Desktop\Python_Program\AssignmentProject1> 
```

Testcase 1: (Doubling)

Input file contains 50 words

Output:

```
PS C:\Users\rana9\OneDrive\Desktop\Python_Program\AssignmentProject1> & C:/Users/rana9/AppData/Local/Programs/Python/Python312/pythor
na9/OneDrive/Desktop/Python_Program/AssignmentProject1/withSpace.py
Enter your value (1 for Incremental, 2 for Doubling, 3 for Fibonacci): 2
Selected option: 2
Starting Strategy B (Doubling)...

Array resized to: 4
Time elapsed: 0.000389800 seconds
Space used by dynamic array: 88 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: babishness->babishness->babysit->babysit->babysit

Array resized to: 8
Time elapsed: 0.001020700 seconds
Space used by dynamic array: 120 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: babishness->babysit->baby-sit->babysitter->babysitter

Array resized to: 16
Time elapsed: 0.001727100 seconds
Space used by dynamic array: 184 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: babishness->baby-sit->baby-sitter->baby-sitting->baby-sized

Array resized to: 32
Time elapsed: 0.002933200 seconds
Space used by dynamic array: 312 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: babishness->baby-sitter->Babism->Babita->chimera

Array resized to: 64
Time elapsed: 0.004372400 seconds
Space used by dynamic array: 568 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: babishness->Babism->chimera->chimerism->chymic
Number of words: 50
Final allocated size: 64
Space used: 568 bytes
Do you want to sort the array? (yes/no): yes
```

Continuing screenshot

```
Do you want to sort the array? (yes/no): yes
Sorting the dynamic array...
Time taken to sort the array: 0.000024800 seconds
Space before sorting: 456 bytes
Space after sorting: 456 bytes
Array sorted successfully.
Enter a word to insert (or type 'done' to finish): backbit
Total search time: 0.000037600 seconds
Inserted 'backbit' at position 16.
After inserting 'backbit':
Number of words: 51
Final allocated size: 64
Space used: 568 bytes
Enter a word to insert (or type 'done' to finish): done
Finished inserting words.
PS C:\Users\rana9\OneDrive\Desktop\Python_Program\AssignmentProject1> █
```

Testcase 1: (Fibonacci)

Input file contains 50 words

Output:

```
PS C:\Users\rana9\OneDrive\Desktop\Python_Program\AssignmentProject1> & C:/Users/rana9/AppData/Local/Programs/Python/Python312/python.exe c:/Users/rana9/OneDrive/Desktop/Python_Program/AssignmentProject1/withSpace.py
Enter your value (1 for Incremental, 2 for Doubling, 3 for Fibonacci): 3
Selected option: 3
Starting Strategy C (Fibonacci)...

Array resized to: 3
Time elapsed: 0.000423300 seconds
Space used by dynamic array: 80 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: babishness->babishness->babysit->babysit->babysit

Array resized to: 4
Time elapsed: 0.001291200 seconds
Space used by dynamic array: 88 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: babishness->babishness->babysit->baby-sit->baby-sit

Array resized to: 5
Time elapsed: 0.002090600 seconds
Space used by dynamic array: 96 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: babishness->babysit->baby-sit->babysitter->babysitter

Array resized to: 8
Time elapsed: 0.002838000 seconds
Space used by dynamic array: 120 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: babishness->babysit->baby-sit->babysitter->baby-sitter
```

Continuing screenshot

```
Array resized to: 13
Time elapsed: 0.003319200 seconds
Space used by dynamic array: 160 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: babishness->baby-sit->baby-sitter->baby-sitting->baby-sized

Array resized to: 21
Time elapsed: 0.003573000 seconds
Space used by dynamic array: 224 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: babishness->babysitter->baby-sitting->baby-snatching->Babita

Array resized to: 34
Time elapsed: 0.003771300 seconds
Space used by dynamic array: 328 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: babishness->babysitting->baby's-slippers->chimera->chimeric

Array resized to: 55
Time elapsed: 0.004486100 seconds
Space used by dynamic array: 496 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: babishness->Babism->chimeras->chimera->chymiferous
Number of words: 50
Final allocated size: 55
Space used: 496 bytes
Do you want to sort the array? (yes/no): yes
```

Continuing screenshot

```
Do you want to sort the array? (yes/no): yes
Sorting the dynamic array...
Time taken to sort the array: 0.000022400 seconds
Space before sorting: 456 bytes
Space after sorting: 456 bytes
Array sorted successfully.
Enter a word to insert (or type 'done' to finish): backbit
Total search time: 0.000028500 seconds
Inserted 'backbit' at position 16.
After inserting 'backbit':
Number of words: 51
Final allocated size: 55
Space used: 496 bytes
Enter a word to insert (or type 'done' to finish):
```

Testcase 2: (Incremental)

Input file contains 100 words

Output

```
Array resized to: 102
Time elapsed: 0.006628900 seconds
Space used by dynamic array: 872 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: a->aarrgh->abacali->abaiser->chieftainships
Number of words: 100
Final allocated size: 102
Space used: 872 bytes
Do you want to sort the array? (yes/no): yes
Sorting the dynamic array...
Time taken to sort the array: 0.000034500 seconds
Space before sorting: 856 bytes
Space after sorting: 856 bytes
Array sorted successfully.
Enter a word to insert (or type 'done' to finish): aband
Total search time: 0.000037700 seconds
Inserted 'aband' at position 74.
After inserting 'aband':
Number of words: 101
Final allocated size: 102
Space used: 872 bytes
Enter a word to insert (or type 'done' to finish): done
Finished inserting words.
PS C:\Users\rana9\OneDrive\Desktop\Python_Program\AssignmentProject1>
```

Testcase 2: (Doubling)

Input file contains 100 words

Output

```
Array resized to: 128
Time elapsed: 0.003393600 seconds
Space used by dynamic array: 1080 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: a->aardwolves->ababua->abacterial->abaff
Number of words: 100
Final allocated size: 128
Space used: 1080 bytes
Do you want to sort the array? (yes/no): yes
Sorting the dynamic array...
Time taken to sort the array: 0.000042900 seconds
Space before sorting: 856 bytes
Space after sorting: 856 bytes
Array sorted successfully.
Enter a word to insert (or type 'done' to finish): aband
Total search time: 0.000031300 seconds
Inserted 'aband' at position 74.
After inserting 'aband':
Number of words: 101
Final allocated size: 128
Space used: 1080 bytes
Enter a word to insert (or type 'done' to finish): done
Finished inserting words.
PS C:\Users\rana9\OneDrive\Desktop\Python_Program\AssignmentProject1> █
```

Testcase 2: (Fibonacci)

Input file contains 100 words

Output

```
Array resized to: 144
Time elapsed: 0.006219900 seconds
Space used by dynamic array: 1208 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: a->aaronitic->abacist->abayah->chieftains
Number of words: 100
Final allocated size: 144
Space used: 1208 bytes
Do you want to sort the array? (yes/no): yes
Sorting the dynamic array...
Time taken to sort the array: 0.000023900 seconds
Space before sorting: 856 bytes
Space after sorting: 856 bytes
Array sorted successfully.
Enter a word to insert (or type 'done' to finish): aband
Total search time: 0.000046800 seconds
Inserted 'aband' at position 74.
After inserting 'aband':
Number of words: 101
Final allocated size: 144
Space used: 1208 bytes
Enter a word to insert (or type 'done' to finish): █
```

Testcase 4 (EOW): (Incremental)

Input file contains 370104 words

Output

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

Time elapsed: 553.743925500 seconds
Space used by dynamic array: 2960872 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: a->dragading->metatherian->samogonka->zutugil

Array resized to: 370112
Time elapsed: 553.776635900 seconds
Space used by dynamic array: 2960952 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: a->dragboat->metathetic->samothere->zwitter
Number of words: 370104
Final allocated size: 370112
Space used: 2960952 bytes
Do you want to sort the array? (yes/no): yes
Sorting the dynamic array...
Time taken to sort the array: 0.049903000 seconds
Space before sorting: 2960888 bytes
Space after sorting: 2960888 bytes
Array sorted successfully.
Enter a word to insert (or type 'done' to finish): padawan
Total search time: 0.000046100 seconds
Inserted 'padawan' at position 221661.
After inserting 'padawan':
Number of words: 370105
Final allocated size: 370112
Space used: 2960952 bytes
Enter a word to insert (or type 'done' to finish): done
Finished inserting words.
PS C:\Users\rana9\OneDrive\Desktop\Python_Program\AssignmentProject1>
```

Testcase 4 (EOW): (Doubling)

Input file contains 370104 words

Output

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

Array resized to: 524288
Time elapsed: 0.147903400 seconds
Space used by dynamic array: 4194360 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: a->condensance->guiled->naio->reattest
Number of words: 370104
Final allocated size: 524288
Space used: 4194360 bytes
Do you want to sort the array? (yes/no): yes
Sorting the dynamic array...
Time taken to sort the array: 0.046384500 seconds
Space before sorting: 2960888 bytes
Space after sorting: 2960888 bytes
Array sorted successfully.
Enter a word to insert (or type 'done' to finish): padawan
Total search time: 0.000060900 seconds
Inserted 'padawan' at position 221661.
After inserting 'padawan':
Number of words: 370105
Final allocated size: 524288
Space used: 4194360 bytes
Enter a word to insert (or type 'done' to finish): done
Finished inserting words.
PS C:\Users\rana9\OneDrive\Desktop\Python_Program\AssignmentProject1> 
```

Testcase 4 (EOW): (Fibonacci)

Input file contains 370104 words

Output

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: a->castor->embossments->illative->nabber

Array resized to: 514229
Time elapsed: 0.178160100 seconds
Space used by dynamic array: 4113888 bytes
Elements at 1st, [n/4]th, [n/2]th, [3n/4]th and nth: a->deforcing->isodactylous->pithos->teentsiest
Number of words: 370104
Final allocated size: 514229
Space used: 4113888 bytes
Do you want to sort the array? (yes/no): yes
Sorting the dynamic array...
Time taken to sort the array: 0.045387500 seconds
Space before sorting: 2960888 bytes
Space after sorting: 2960888 bytes
Array sorted successfully.
Enter a word to insert (or type 'done' to finish): padawan
Total search time: 0.000041200 seconds
Inserted 'padawan' at position 221661.
After inserting 'padawan':
Number of words: 370105
Final allocated size: 514229
Space used: 4113888 bytes
Enter a word to insert (or type 'done' to finish): done
Finished inserting words.
PS C:\Users\rana9\OneDrive\Desktop\Python_Program\AssignmentProject1> 
```


Input & Output file of dynamic array created by python list:

Testcase 1:

Input file contains 50 words

Output

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
PS C:\Users\rana9\OneDrive\Desktop\Python_Program\AssignmentProject1> & C:/Users/rana9/AppData/Local/Programs/Python/Python312/python.exe C:/Users/rana9/OneDrive/Desktop/Python_Program/AssignmentProject1/DynamicArrayList.py
Time elapsed for array: 0.000669900 seconds
Total size of list and its elements: 2959 bytes
Number of words: 50
Do you want to sort the list? (yes/no): yes
Sorting the list...
space_before_sort: 2959 bytes
space_after_sort: 2959 bytes
Total sort time: 0.000272200 seconds
List sorted successfully.
Enter a word to insert (or type 'done' to finish): backbit
Total search time: 0.000013100 seconds
Inserted 'backbit' at position 16.
After inserting 'backbit':
Number of words: 51
After inserting total space: 3007 bytes
Enter a word to insert (or type 'done' to finish): done
Finished inserting words.
Final list of words:
PS C:\Users\rana9\OneDrive\Desktop\Python_Program\AssignmentProject1>
```

Testcase 2:

Input file contains 100 words

Output

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
PS C:\Users\rana9\OneDrive\Desktop\Python_Program\AssignmentProject1> & C:/Users/rana9/AppData/Local/Programs/Python/Python312/python.exe C:/Users/rana9/OneDrive/Desktop/Python_Program/AssignmentProject1/DynamicArrayList.py
Time elapsed for array: 0.008363500 seconds
Total size of list and its elements: 5725 bytes
Number of words: 100
Do you want to sort the list? (yes/no): yes
Sorting the list...
space_before_sort: 5725 bytes
space_after_sort: 5725 bytes
Total sort time: 0.000369800 seconds
List sorted successfully.
Enter a word to insert (or type 'done' to finish): aband
Total search time: 0.000029900 seconds
Inserted 'aband' at position 74.
After inserting 'aband':
Number of words: 101
After inserting total space: 5771 bytes
Enter a word to insert (or type 'done' to finish): done
Finished inserting words.
Final list of words:
PS C:\Users\rana9\OneDrive\Desktop\Python_Program\AssignmentProject1>
```

Testcase 3:

Input file contains 600 words

Output

```
25 | for item in lst:
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS C:\Users\rana9\OneDrive\Desktop\Python_Program\AssignmentProject1> & C:/Users/rana9/AppData/
/Users/rana9/OneDrive/Desktop/Python_Program/AssignmentProject1/DynamicArrayList.py
Time elapsed for array: 0.000746500 seconds
Total size of list and its elements: 35674 bytes
Number of words: 602
Do you want to sort the list? (yes/no): yes
Sorting the list...
space_before_sort: 35674 bytes
space_after_sort: 35674 bytes
Total sort time: 0.000485400 seconds
List sorted successfully.
Enter a word to insert (or type 'done' to finish): inordinacy
Total search time: 0.000021400 seconds
Inserted 'inordinacy' at position 548.
After inserting 'inordinacy':
Number of words: 603
After inserting total space: 35725 bytes
Enter a word to insert (or type 'done' to finish):
```

Testcase 4 (EOW):

Input file contains 370104 words

Output

```
25 | for item in lst:
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS C:\Users\rana9\OneDrive\Desktop\Python_Program\AssignmentProject1> & C:/Users/rana9/AppData/Local/Programs/Py
/Users/rana9/OneDrive/Desktop/Python_Program/AssignmentProject1/DynamicArrayList.py
Time elapsed for array: 0.146842900 seconds
Total size of list and its elements: 21961623 bytes
Number of words: 370104
Do you want to sort the list? (yes/no): yes
Sorting the list...
space_before_sort: 21961623 bytes
space_after_sort: 21961623 bytes
Total sort time: 0.149378400 seconds
List sorted successfully.
Enter a word to insert (or type 'done' to finish): padawan
Total search time: 0.000053400 seconds
Inserted 'padawan' at position 221661.
After inserting 'padawan':
Number of words: 370105
After inserting total space: 21961671 bytes
Enter a word to insert (or type 'done' to finish): done
Finished inserting words.
Final list of words:
PS C:\Users\rana9\OneDrive\Desktop\Python_Program\AssignmentProject1>
```

Comparison time & Space:

Testcase	Incremental	Doubling	Fibonacci	Python List
Testcase1 =50 words	1.Dynamic Array Creation time =0.006180000 sec Space=472 bytes 2.Sorting time =0.000031200 sec Space =456 bytes 3.Insertion (backbit) Search time= 0.000039100 sec Space = 472 bytes	1.Dynamic Array Creation time =0.004372400sec Space=568bytes 2.Sorting time =0.000024800sec Space =456 bytes 3.Insertion (backbit) Search time= 0.000037600sec Space = 568bytes	1.Dynamic Array Creation time = 0.004486100 sec Space=496 bytes 2.Sorting time =0.000022400sec Space =456 bytes 3.Insertion (backbit) Search time= 0.000028500 sec Space = 496 bytes	1.Dynamic Array Creation time =0.000669900 sec Space=2959 bytes 2.Sorting time = 0.000272200 sec Space = 2959 bytes 3.Insertion (backbit) Search time= 0.000013100 sec Space = 3007 bytes
Testcase2 =100 words	1.Dynamic Array Creation time = 0.006628900 sec Space=872 bytes 2.Sorting time =0.000034500 sec Space =856 bytes 3.Insertion (aband) Search time= 0.000037700 sec Space = 872 bytes	1.Dynamic Array Creation time = 0.003393600sec Space=1080bytes 2.Sorting time =0.000042900 sec Space =856 bytes 3.Insertion (aband) Search time = 0.000031300 sec Space = 1080bytes	1.Dynamic Array Creation time = 0.006219900 sec Space=1208bytes 2.Sorting time =0.000023900sec Space =856 bytes 3.Insertion (aband) Search time = 0.000046800sec Space = 1208 bytes	1.Dynamic Array Creation time = 0.008363500 sec Space=5725 2.Sorting time =0.000369800 sec Space =5725 bytes 3.Insertion (aband) Search time = 0.000029900 sec Space = 5771 bytes
Testcase3 =602 words	1.Dynamic Array Creation time = 0.000162800sec Space=4872bytes 2.Sorting time =0.000162800sec Space =4872bytes 3.Insertion (inordinacy) Search time= 0.000034300 sec Space = 4952 bytes	1.Dynamic Array Creation time = 0.005659400 sec Space=8248 bytes 2.Sorting time =0.000130600sec Space =4872bytes 3.Insertion (inordinacy) Search time= 0.000047200sec Space = 8248 bytes	1.Dynamic Array Creation time = 0.007797100sec Space=4936 2.Sorting time =0.000129500sec Space =4872bytes 3.Insertion (inordinacy) Search time= 0.000047000 sec Space = 4936 bytes	1.Dynamic Array Creation time = 0.000746500 Space= 35674 bytes 2.Sorting time = 0.000485400 sec Space = 35674 bytes 3.Insertion (inordinacy) Search time= 0.000021400 sec Space = 35725 bytes
Testcase4 =370104 words	1.Dynamic Array Creation time = 553.776635900 Space= 2960952 bytes	1.Dynamic Array Creation time = 0.147903400 sec	1.Dynamic Array Creation time = 0.178160100 sec	1.Dynamic Array Creation time = 0.146842900 sec

	2.Sorting time = 0.049903000 sec Space = 2960888 bytes 3.Insertion (padawan) Search time= 0.000046100 sec Space = 2960952 bytes	Space= 4194360 bytes 2.Sorting time = 0.046384500 sec Space = 2960888 bytes 3.Insertion (padawan) Search time= 0.000060900 sec Space = 4194360 bytes	Space= 4113888 bytes 2.Sorting time = 0.045387500 sec Space = 2960888 bytes 3.Insertion (padawan) Search time= 0.000041200 sec Space = 4113888 bytes	Space= 21961623 bytes 2.Sorting time = 0.149378400 sec Space = 21961623 bytes 3.Insertion (padawan) Search time= 0.000053400 sec Space = 21961671 bytes
--	---	---	---	--