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Data structure Homework -2

1. Create a list (0, 1, ..., 499, 501, ..., 999, 1000).
Implemented by linked lists.

```
1  #include <stdio.h>
2  #include <stdlib.h>
3
4  int main()
5  {
6      int a[1000];
7
8      int i, x, pos;
9
10     int* pa = a;
11
12     for(i = 0; i <= 1000; i++)
13     {
14         if(i==500){
15             continue;
16         }
17         printf("a[%d] \n",i);
18         pa++;
19         x = 500; // element to be inserted
20         pos = 500; // position at which element is to be inserted
21         for (i = 1000; i >= pos; i--) // shift elements forward
22             a[i] = a[i - 1];
23         a[pos - 1] = x; // insert x at pos
24         for (i = 0; i <= 1000; i++) // print the updated array
25             printf("%d ", a[i]);
26         printf("\n");
27
28         return 0;
29     }
```

Result:

Output will be

```
a[479]  
a[480]  
a[481]  
a[482]  
a[483]  
a[484]  
a[485]  
a[486]  
a[487]  
a[488]  
a[489]  
a[490]  
a[491]  
a[492]  
a[493]  
a[494]  
a[495]  
a[496]  
a[497]  
a[498]  
a[499]  
a[501]  
a[502]  
a[503]  
a[504]  
a[505]  
a[506]  
a[507]  
a[508]  
a[509]  
a[510]  
a[511]  
a[512]  
a[513]  
a[514]  
a[515]  
a[516]  
a[517]  
a[518]  
a[519]  
a[520]  
a[521]  
a[522]  
a[523]
```

Insertion 500 in position

```

1  #include <stdio.h>
2  #include <stdlib.h>
3
4  int main()
5  {
6      int a[1000];
7
8      int i, x, pos;
9
10     int* pa = a;
11
12     for(i = 0; i <= 1000; i++)
13     {
14         if(i==500){
15             continue;
16         }
17         printf("a[%d] \n",i);
18         pa++;
19
20         x = 500; // element to be inserted
21         pos = 500; // position at which element is to be inserted
22         for (i = 1000; i >= pos; i--) // shift elements forward
23             a[i] = a[i - 1];
24         a[pos - 1] = x; // insert x at pos
25         for (i = 0; i <= 1000; i++) // print the updated array
26             printf("%d ", a[i]);
27         printf("\n");
28
29         return 0;
30     }

```

Time complexity of this array is: $O(1)$.