C_134 ⇒ Dynamic Memory Allocation using Calloc()

* Calloc() is used to allocate memory dynamically and full form of (alloc) is Contiguous allocation.

* Calloc() is a built in functions which is declared inside the file stdlib.h.

* Calloc() used to dynamically allocate multiple blocks of memory and each block is of same size.

* malloc() allocates single block of memory

* calloc() accepts two arguments but malloc() takes only one argument.

(void *) Calloc(size_t n , size_t size)

- (void *) → returns type
- size_t n → unsigned int → no. of blocks
- size_t size → size of each blak.

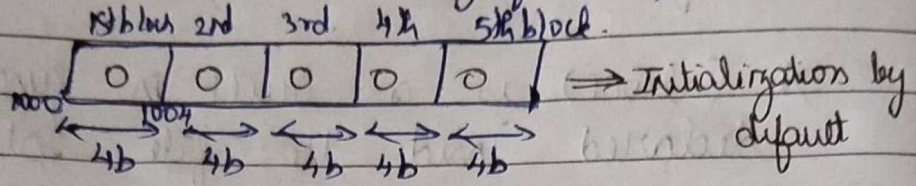
int *ptr; → Static Memory allocation

ptr = (int*) Calloc(5, sizeof(int)); → DMA using Calloc

- ptr → store the base address in pointer which is of int type
- (int*) Calloc() returns base address of int type; So type cast from void to int
- 1st blk, 2nd blk, 3rd blk, 4th blk, 5th blk
- 1000 → base address.
- 4 bytes, 4b, 4b, 4b, 4b

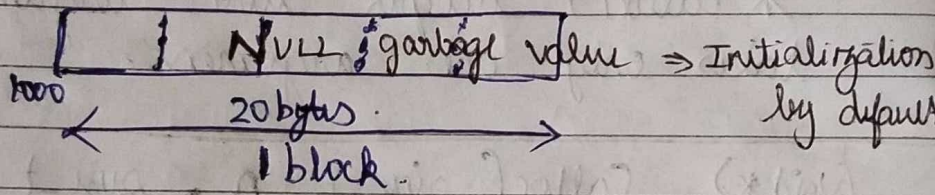
Difference b/w malloc() & calloc()

```
int *ptr;
ptr = (int *) calloc (5, sizeof(int));
```



* It will allocate 5 blocks of each of size 4 bytes

```
int *ptr;
ptr = (int *) malloc (5 * sizeof(int));
```



* It will allocate 1 block of 20 bytes

NOTE:

* The memory allocated by calloc() by default initialized with zero

* The memory allocated by malloc() by default initialized to any garbage values

Assignment: allocate 5 integer values using calloc() then free the memory and allocate 10 float values using malloc() and free the memory.

Program ①

```
int main()
{
    int n, i, *ptr;
printf("Enter total no. of values:\n");
scanf("%d", &n);

ptr = (int *) calloc(n, sizeof(int));

// printf("Enter values:");
for(i=0; i<n; i++)
{
    scanf("%d", (ptr+i));
}
//
printf("Entered values are:");
for(i=0; i<n; i++)
{
    printf("%d", *(ptr+i));
}
free(ptr);
}
```

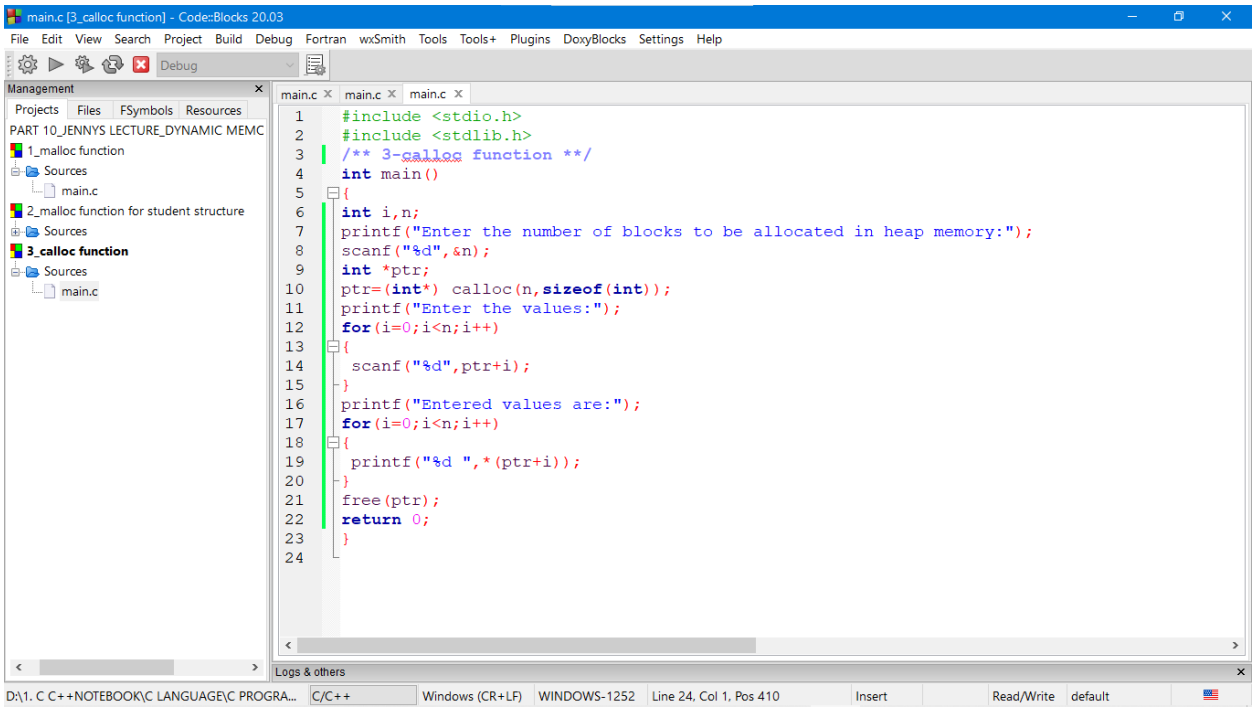
Pg ②

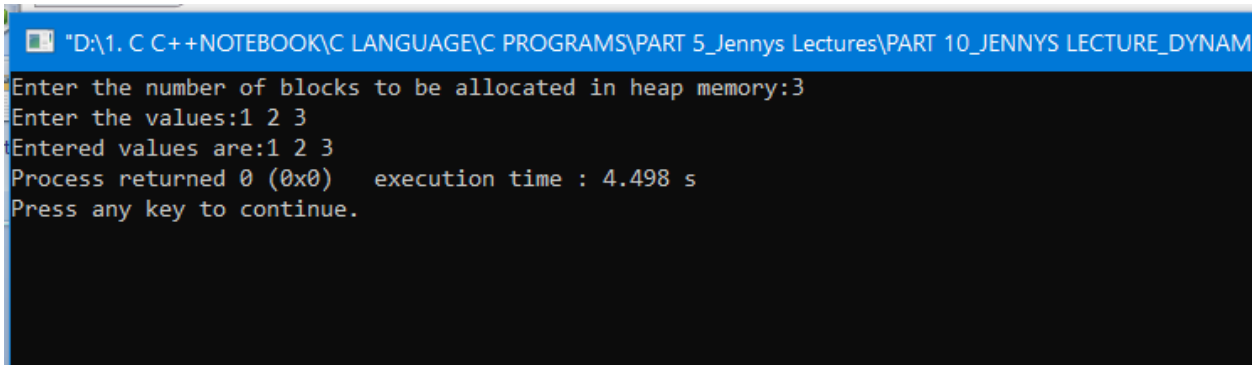
Check without initializing and the output will be printed as 0's.

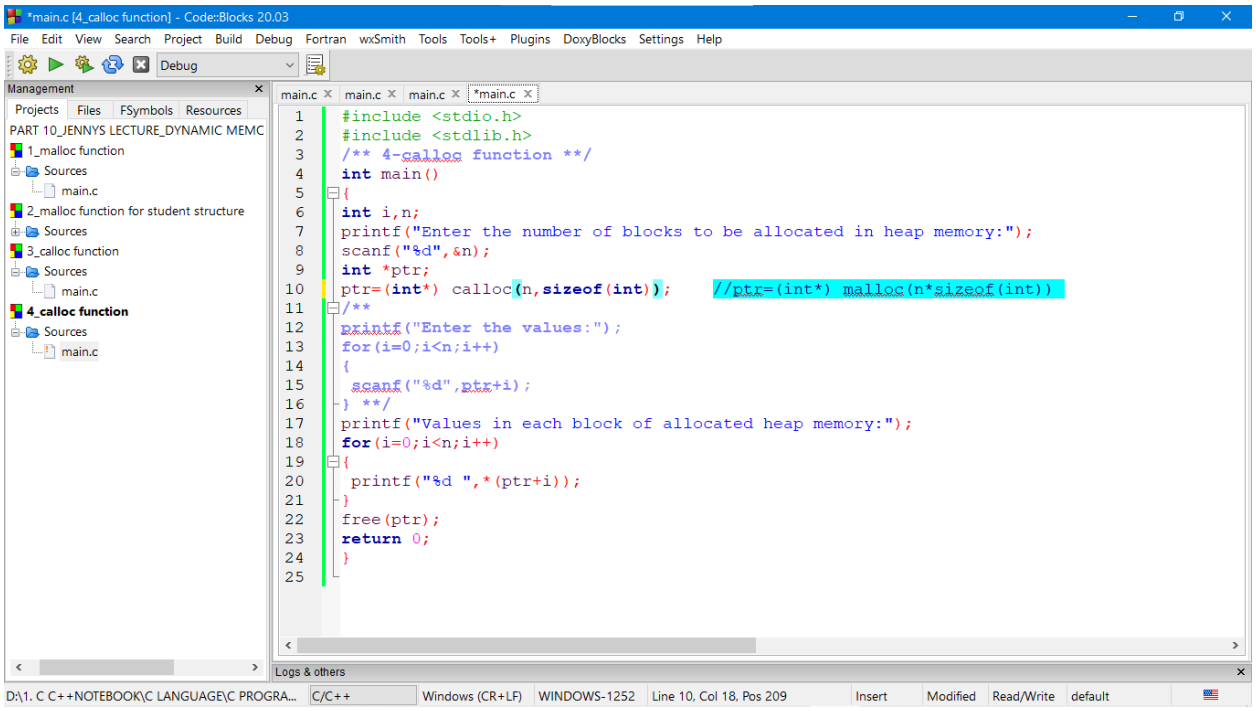
O/P:- Pgm1 Enter total no. of values: 3
Enter values: 1 2 3
Entered values: 1 2 3.

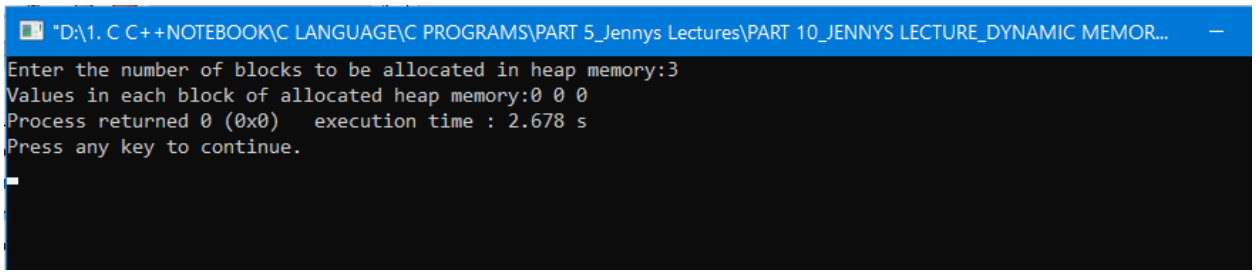
O/P Pgm 2 Enter total no. of values: 3
Entered values: 0 0 0

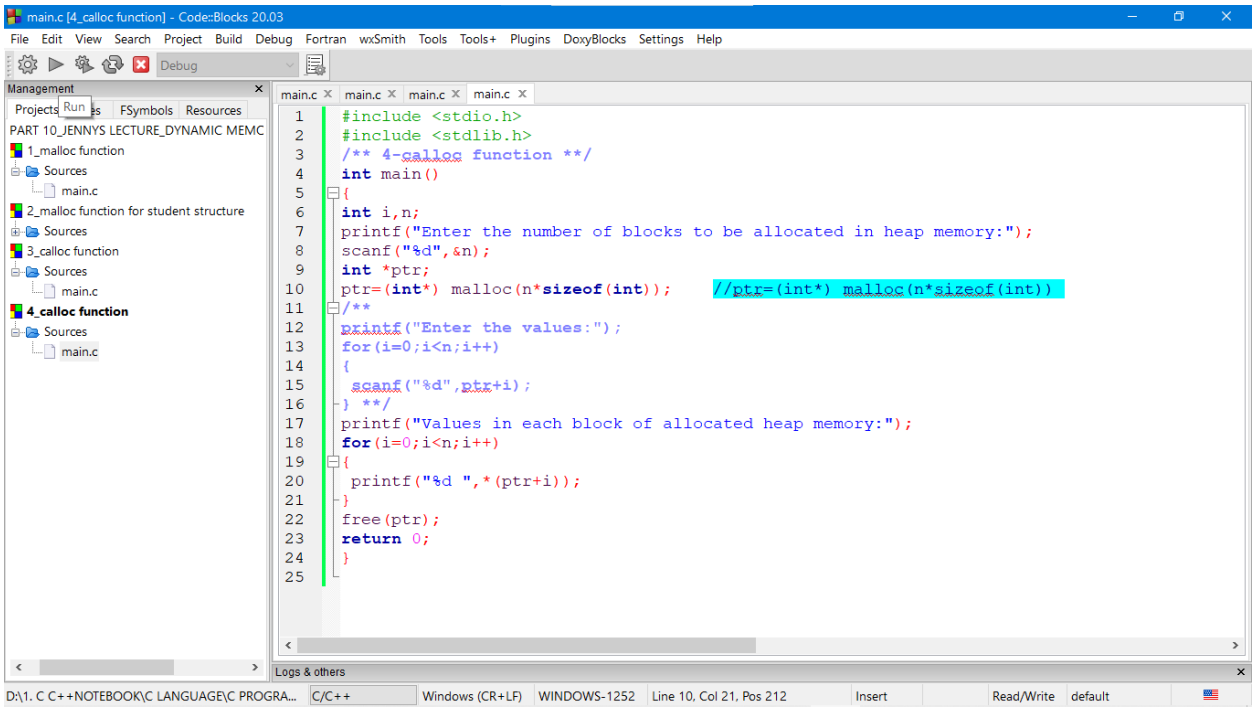
Pgm 3:- If you do the same thing with malloc() you will get garbage values.

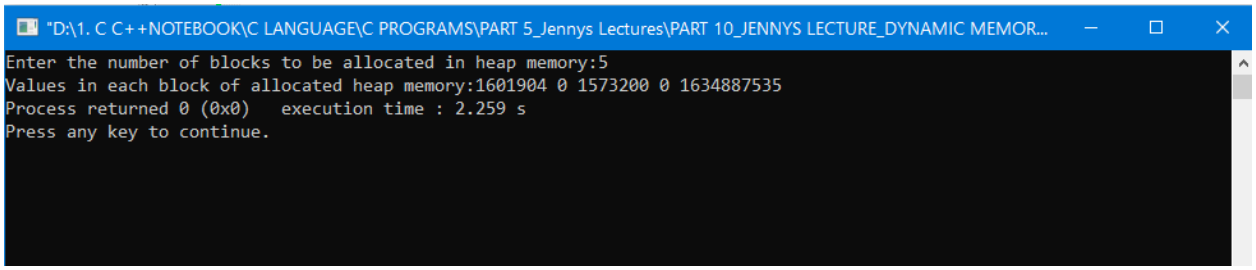

main.c [3_calloc function] - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
Debug
Management
Projects Files FSymbols Resources
PART 10_JENNYS LECTURE_DYNAMIC MEMC
1_malloc function
Sources
main.c
2_malloc function for student structure
Sources
3_calloc function
Sources
main.c
main.c main.c main.c
#include <stdio.h>
#include <stdlib.h>
/** 3-calloc function **/
int main()
{
int i,n;
printf("Enter the number of blocks to be allocated in heap memory:");
scanf("%d",&n);
int *ptr;
ptr=(int*) calloc(n,sizeof(int));
printf("Enter the values:");
for(i=0;i<n;i++)
{
scanf("%d",ptr+i);
}
printf("Entered values are:");
for(i=0;i<n;i++)
{
printf("%d ",*(ptr+i));
}
free(ptr);
return 0;
}
Logs & others
D:\1. C C++NOTEBOOK\C LANGUAGE\C PROGRA... C/C++ Windows (CR+LF) WINDOWS-1252 Line 24, Col 1, Pos 410 Insert Read/Write default

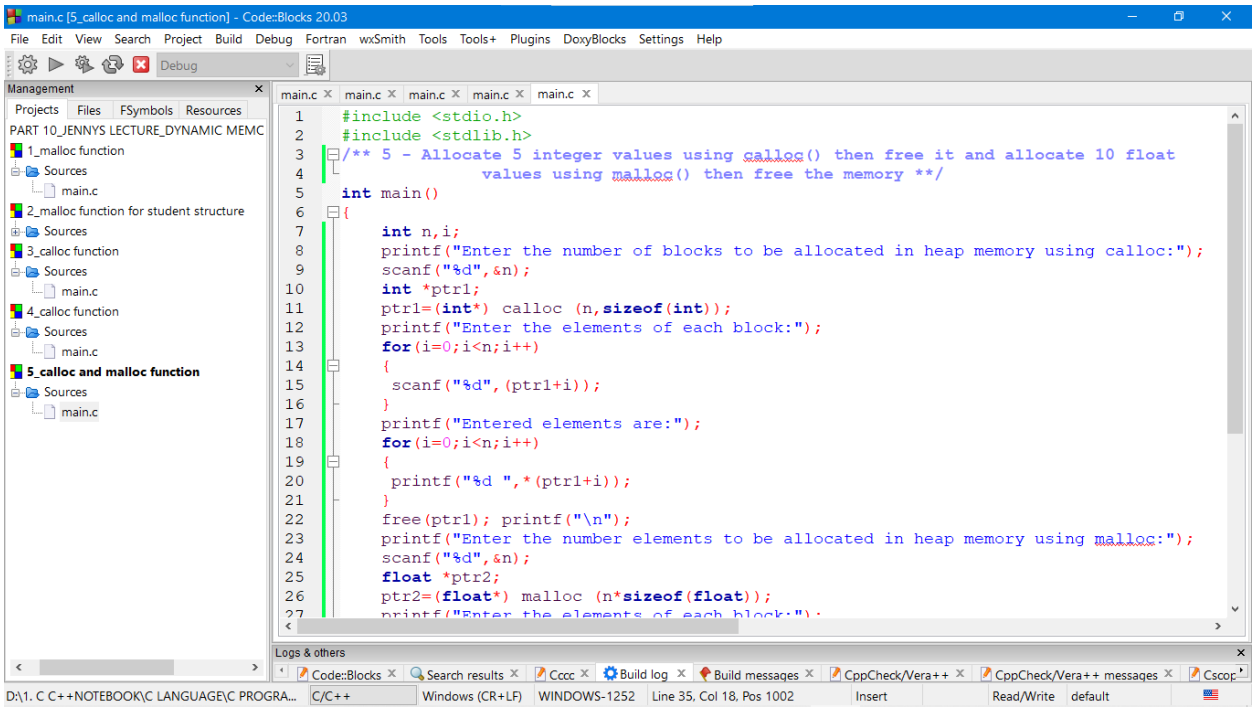

"D:\1. C C++NOTEBOOK\C LANGUAGE\C PROGRAMS\PART 5_Jennys Lectures\PART 10_JENNYS LECTURE_DYNAM
Enter the number of blocks to be allocated in heap memory:3
Enter the values:1 2 3
Entered values are:1 2 3
Process returned 0 (0x0) execution time : 4.498 s
Press any key to continue.

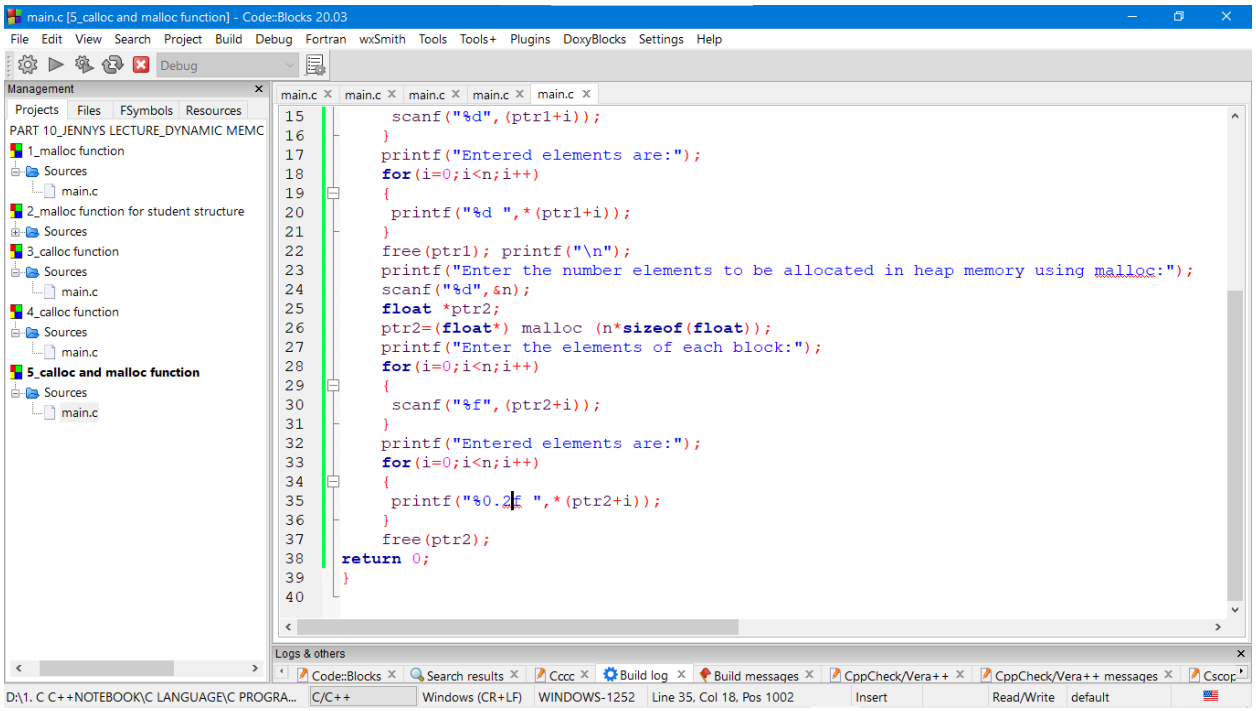

*main.c [4_calloc function] - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
Debug
Management
Projects Files FSymbols Resources
PART 10_JENNYS LECTURE_DYNAMIC MEMC
1_malloc function
Sources
main.c
2_malloc function for student structure
Sources
3_calloc function
Sources
main.c
4_calloc function
Sources
main.c
main.c main.c main.c *main.c
1 #include <stdio.h>
2 #include <stdlib.h>
3 /** 4-calloc function **/
4 int main()
5 {
6 int i,n;
7 printf("Enter the number of blocks to be allocated in heap memory:");
8 scanf("%d",&n);
9 int *ptr;
10 ptr=(int*) calloc(n,sizeof(int)); //ptr=(int*) malloc(n*sizeof(int))
11 /**
12 printf("Enter the values:");
13 for(i=0;i<n;i++)
14 {
15 scanf("%d",ptr+i);
16 } **/
17 printf("Values in each block of allocated heap memory:");
18 for(i=0;i<n;i++)
19 {
20 printf("%d ",*(ptr+i));
21 }
22 free(ptr);
23 return 0;
24 }
25
Logs & others
D:\1. C C++NOTEBOOK\C LANGUAGE\C PROGRA... C/C++ Windows (CR+LF) WINDOWS-1252 Line 10, Col 18, Pos 209 Insert Modified Read/Write default

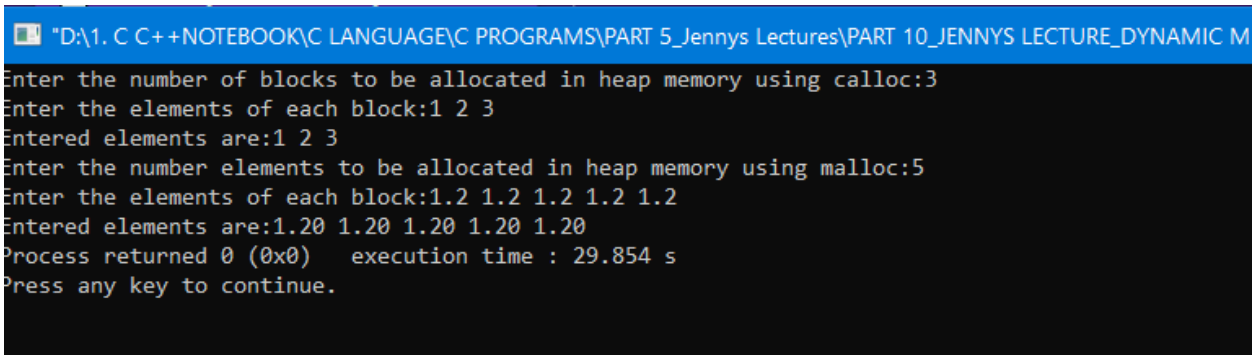

"D:\1. C C++NOTEBOOK\C LANGUAGE\C PROGRAMS\PART 5_Jennys Lectures\PART 10_JENNYS LECTURE_DYNAMIC MEMOR...
Enter the number of blocks to be allocated in heap memory:3
Values in each block of allocated heap memory:0 0 0
Process returned 0 (0x0) execution time : 2.678 s
Press any key to continue.


main.c [4_calloc function] - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
Debug
Management
Projects Run FSymbols Resources
PART 10_JENNYS LECTURE_DYNAMIC MEMC
1_malloc function
Sources
main.c
2_malloc function for student structure
Sources
3_calloc function
Sources
main.c
4_calloc function
Sources
main.c
main.c main.c main.c main.c
1 #include <stdio.h>
2 #include <stdlib.h>
3 /** 4-calloc function **/
4 int main()
5 {
6 int i,n;
7 printf("Enter the number of blocks to be allocated in heap memory:");
8 scanf("%d",&n);
9 int *ptr;
10 ptr=(int*) malloc(n*sizeof(int)); //ptr=(int*) malloc(n*sizeof(int))
11 /**
12 printf("Enter the values:");
13 for(i=0;i<n;i++)
14 {
15 scanf("%d",ptr+i);
16 } **/
17 printf("Values in each block of allocated heap memory:");
18 for(i=0;i<n;i++)
19 {
20 printf("%d ",*(ptr+i));
21 }
22 free(ptr);
23 return 0;
24 }
25
Logs & others
D:\1. C C++NOTEBOOK\C LANGUAGE\C PROGRA... C/C++ Windows (CR+LF) WINDOWS-1252 Line 10, Col 21, Pos 212 Insert Read/Write default


"D:\1. C C++NOTEBOOK\C LANGUAGE\C PROGRAMS\PART 5_Jennys Lectures\PART 10_JENNYS LECTURE_DYNAMIC MEMOR...
Enter the number of blocks to be allocated in heap memory:5
Values in each block of allocated heap memory:1601904 0 1573200 0 1634887535
Process returned 0 (0x0) execution time : 2.259 s
Press any key to continue.


main.c [5_calloc and malloc function] - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
Debug
Management
Projects Files FSymbols Resources
PART 10_JENNYS LECTURE_DYNAMIC MEMC
1_malloc function
Sources
main.c
2_malloc function for student structure
Sources
3_calloc function
Sources
main.c
4_calloc function
Sources
main.c
5_calloc and malloc function
Sources
main.c
main.c main.c main.c main.c main.c
#include <stdio.h>
#include <stdlib.h>
/** 5 - Allocate 5 integer values using calloc() then free it and allocate 10 float
values using malloc() then free the memory **/
int main()
{
int n,i;
printf("Enter the number of blocks to be allocated in heap memory using calloc:");
scanf("%d",&n);
int *ptr1;
ptr1=(int*) calloc (n,sizeof(int));
printf("Enter the elements of each block:");
for(i=0;i<n;i++)
{
scanf("%d",(ptr1+i));
}
printf("Entered elements are:");
for(i=0;i<n;i++)
{
printf("%d ",*(ptr1+i));
}
free(ptr1); printf("\n");
printf("Enter the number elements to be allocated in heap memory using malloc:");
scanf("%d",&n);
float *ptr2;
ptr2=(float*) malloc (n*sizeof(float));
Logs & others
Code::Blocks Search results Cccc Build log Build messages CppCheck/Vera++ CppCheck/Vera++ messages Cscop
D:\1. C C++NOTEBOOK\C LANGUAGE\C PROGRA... C/C++ Windows (CR+LF) WINDOWS-1252 Line 35, Col 18, Pos 1002 Insert Read/Write default


main.c [5_calloc and malloc function] - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
Debug
Management
Projects Files FSymbols Resources
PART 10_JENNYS LECTURE_DYNAMIC MEMC
1_malloc function
Sources
main.c
2_malloc function for student structure
Sources
3_calloc function
Sources
main.c
4_calloc function
Sources
main.c
5_calloc and malloc function
Sources
main.c
main.c main.c main.c main.c main.c
scanf("%d",(ptr1+i));
}
printf("Entered elements are:");
for(i=0;i<n;i++)
{
printf("%d ",*(ptr1+i));
}
free(ptr1); printf("\n");
printf("Enter the number elements to be allocated in heap memory using malloc:");
scanf("%d",&n);
float *ptr2;
ptr2=(float*) malloc (n*sizeof(float));
printf("Enter the elements of each block:");
for(i=0;i<n;i++)
{
scanf("%f",(ptr2+i));
}
printf("Entered elements are:");
for(i=0;i<n;i++)
{
printf("%0.2f ",*(ptr2+i));
}
free(ptr2);
return 0;
}
Logs & others
Code::Blocks Search results Cccc Build log Build messages CppCheck/Vera++ CppCheck/Vera++ messages Cscop
D:\1. C C++NOTEBOOK\C LANGUAGE\C PROGRA... C/C++ Windows (CR+LF) WINDOWS-1252 Line 35, Col 18, Pos 1002 Insert Read/Write default


"D:\1. C C++NOTEBOOK\C LANGUAGE\C PROGRAMS\PART 5_Jennys Lectures\PART 10_JENNYS LECTURE_DYNAMIC M
Enter the number of blocks to be allocated in heap memory using calloc:3
Enter the elements of each block:1 2 3
Entered elements are:1 2 3
Enter the number elements to be allocated in heap memory using malloc:5
Enter the elements of each block:1.2 1.2 1.2 1.2 1.2
Entered elements are:1.20 1.20 1.20 1.20 1.20
Process returned 0 (0x0)   execution time : 29.854 s
Press any key to continue.