InitializeMemoryManager( ); // below is the contents of the MM\_Pool after InitializeMemoryManager( ) is called

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | [0] | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] | [9] | [10] | [11] | [12] | [13] | [14] | [15] | [16] | [17] | [18] | [19] |
| [0] | 6 | | 0 | | 0 | | free |  |  |  |  |  |  |  |  |  |  |  |  |  |
| [20] |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| [40] |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| [60] |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| [80] |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| Next Free | [0:1] | 6 |
| InUse | [2:3] | 0 |
| Used | [4:5] | 0 |

This is an abstract view of the InUse and Used linked lists. Right now they are both empty.

char \* name = (char \*) allocate(10); // gonna store my name – “SteveGold” – need 10 char array, 9 for “SteveGold’

// and one for the null

|  |  |  |
| --- | --- | --- |
| Next Free | [0:1] | 22 |
| InUse | [2:3] | 6 |
| Used | [4:5] | 0 |

|  |  |  |  |
| --- | --- | --- | --- |
| [6:7] | [8:9] | [10:11] | [12:21] |
| 10 | 0 | 0 |  |
| (size) | (next) | (prev) |  |

Driver Variables (inside the program)

|  |  |  |
| --- | --- | --- |
| name | &MM\_Pool[12] |  |

strcpy(name,“SteveGold”); // copied SteveGold into the name array

|  |  |  |
| --- | --- | --- |
| Next Free | [0:1] | 22 |
| InUse | [2:3] | 6 |
| Used | [4:5] | 0 |

|  |  |  |  |
| --- | --- | --- | --- |
| [6:7] | [8:9] | [10:11] | [12:21] |
| 10 | 0 | 0 | “SteveGold” |

Driver Variables

|  |  |  |
| --- | --- | --- |
| name | &MM\_Pool[12] |  |

Int \* grade = (int \*) allocate(sizeof(int)); // gonna get a variable for my grade

\*grade = 98; // I set my grade to 98

|  |  |  |
| --- | --- | --- |
| Next Free | [0:1] | 32 |
| InUse | [2:3] | 22 |
| Used | [4:5] | 0 |

|  |  |  |  |
| --- | --- | --- | --- |
| [6:7] | [8:9] | [10:11] | [12:21] |
| 10 | 0 | 22 | “SteveGold” |

|  |  |  |  |
| --- | --- | --- | --- |
| [22:23] | [24:25] | [26:27] | [28:31] |
| 4 | 6 | 0 | 98 |

Driver Variables

|  |  |  |
| --- | --- | --- |
| name | &MM\_Pool[12] |  |
| grade | &MM\_Pool[28] |  |

myDate \* bday = (myDate \*) allocate(sizeof(myDate)); // get some memory for my birthday – 3 integers or 12 bytes

bday = myDate(5,11,1959); // using the constructor and overloaded assignment operator

|  |  |  |
| --- | --- | --- |
| Next Free | [0:1] | 50 |
| inUse | [2:3] | 32 |
| Used | [4:5] | 0 |

|  |  |  |  |
| --- | --- | --- | --- |
| [32:33] | [34:35] | [36:37] | [38:49] |
| 10 | 22 | 0 | 5,11,1959 |

|  |  |  |  |
| --- | --- | --- | --- |
| [22:23] | [24:25] | [26:27] | [28:31] |
| 4 | 6 | 32 | 98 |

Driver Variables

|  |  |  |
| --- | --- | --- |
| name | &MM\_Pool[12] |  |
| grade | &MM\_Pool[28] |  |
| bday | &MM\_Pool[38] |  |

|  |  |  |  |
| --- | --- | --- | --- |
| [6:7] | [8:9] | [10:11] | [12:21] |
| 10 | 0 | 22 | “SteveGold” |

deallocate(grade);

grade = null; // this assignment has no effect on the Memory Pool, it only sets the grade pointer to null.

|  |  |  |
| --- | --- | --- |
| Next Free | [0:1] | 50 |
| inUse | [2:3] | 32 |
| Used | [4:5] | 22 |

|  |  |  |  |
| --- | --- | --- | --- |
| [32:33] | [34:35] | [36:37] | [38:49] |
| 10 | 6 | 0 | 5,11,1959 |

Driver Variables

|  |  |  |
| --- | --- | --- |
| name | &MM\_Pool[12] |  |
| grade | null | 0 |
| bday | &MM\_Pool[38] |  |

|  |  |  |  |
| --- | --- | --- | --- |
| [6:7] | [8:9] | [10:11] | [12:21] |
| 10 | 0 | 32 | “SteveGold” |

|  |  |  |  |
| --- | --- | --- | --- |
| [22:23] | [24:25] | [26:27] | [28:31] |
| 4 | 0 | 0 | 98 |

deallocate(name);

name = null; // this assignment has no effect on the Memory Pool, it only sets the name pointer to null

|  |  |  |
| --- | --- | --- |
| Next Free | [0:1] | 50 |
| inUse | [2:3] | 32 |
| Used | [4:5] | 6 |

|  |  |  |  |
| --- | --- | --- | --- |
| [32:33] | [34:35] | [36:37] | [38:49] |
| 10 | 0 | 0 | 5,11,1959 |

Driver Variables

|  |  |  |
| --- | --- | --- |
| name | null | 0 |
| grade | null | 0 |
| bday | &MM\_Pool[38] |  |

|  |  |  |  |
| --- | --- | --- | --- |
| [6:7] | [8:9] | [10:11] | [12:21] |
| 10 | 22 | 0 | “SteveGold” |

|  |  |  |  |
| --- | --- | --- | --- |
| [22:23] | [24:25] | [26:27] | [28:31] |
| 4 | 0 | 6 | 98 |

MM\_Pool Contents after the program is run

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | [0] | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] | [9] | [10] | | [11] | | [12] | [13] | [14] | [15] | [16] | [17] | [18] | [19] |
| [0] | 50 | | 32 | | 6 | | 10 | | 22 | | 0 | | | | **S** | **t** | **e** | **v** | **e** | **G** | **o** | **l** |
| [20] | **d** | **\0** | 4 | | 0 | | 6 | | **98** | | | | | | 10 | | 0 | | 0 | |  |  |
| [40] | **5, 11, 1959** | | | | | | | | | | | free | |  |  |  |  |  |  |  |  |  |
| [60] |  |  |  |  |  |  |  |  |  |  |  | |  | |  |  |  |  |  |  |  |  |
| [80] |  |  |  |  |  |  |  |  |  |  |  | |  | |  |  |  |  |  |  |  |  |