Algorithm 1 Sample Memory Allocator Implementation

```
function MALLOC(sz)
    $sz \leftarrow$ ALIGN_UP($sz$, MAX_ALIGNMENT)    ▷ Align size to max alignment
    MallocCounter $\leftarrow$ MallocCounter $- sz$    ▷ Update remaining memory
    ptrLink $\leftarrow$ &ptr[MallocCounter]    ▷ Calculate pointer address
    ptrLink $\leftarrow$ SET_BOUNDS(ptrLink, $sz$)    ▷ Set bounds for memory safety and to track the length of the pointer
    return ptrLink    ▷ Return allocated memory pointer
end function
```

```
function FREE(ptr)
    len $\leftarrow$ GET_LENGTH(ptr)    ▷ Get length of memory block from the defined bounds
    UNMAP(ptr, len)    ▷ Release memory block
end function
```

```
function INIT_ALLOC
    sz $\leftarrow$ 1 GB    ▷ Define pre-allocated memory size
    fd $\leftarrow$ CREATE_LARGE_PAGE_MEMORY(sz)    ▷ Create shared memory
    ptr $\leftarrow$ MAP_MEMORY(sz)    ▷ Map memory region
    MallocCounter $\leftarrow$ sz    ▷ Initialize memory counter
end function
```