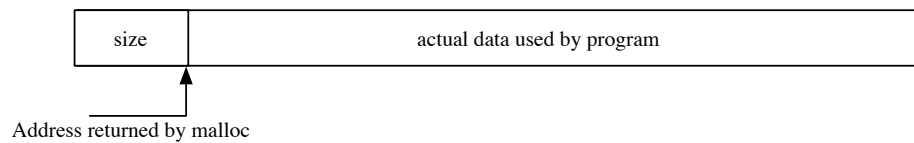


CmpSci 201

Lab 10

In this lab you'll implement a dumb malloc system. The malloc function is a simple soul, it takes as input (in R4) the number of bytes needed by the client program and it returns the address of the first byte. Now, a malloc allocation record in the heap is a little more complicated than just a bag of bytes. Malloc needs to keep track of the size of the allocation (for later freeing). So a malloc record is first the size of the allocation (which will fit in a 4-byte integer) and then the allocated bytes themselves. So when a user calls malloc asking for n bytes, malloc must allocate n+4. In graphical form, a malloc record looks like:



1. Write a function, that given a size and an address, will allocate a malloc record at that address, write the size into the first four bytes and return a pointer to the start of the user data.
2. Write a function, malloc, that will take repeated requests for memory and satisfy them by just placing them one after another in memory. Hint, use the code from the previous problem.
3. Run this code on your malloc code:

```
MOV    R4, #53
BL     malloc
MOV    R4, #1
MOV    R4, R4, #11 ;R4 = 2048
BL     malloc
MOV    R4, #0
BL     malloc
MOV    R4, #2
BL     malloc
```

Be sure to check your code, because I will.