2)

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    JUPYTER

PS C:\Users\m2018\OneDrive\Documents\NMSU\Fall 2022\CS 471\assignments> ./programming1.exe
array is located at:                6421904  located on the stack.
S is located at:                    6421900  located on the stack
My name is Manuel Holguin
PS C:\Users\m2018\OneDrive\Documents\NMSU\Fall 2022\CS 471\assignments>
```

Figure 1- Screen shot of the program running array and S pointer both located on the same segment on the Stack.

3)

a) The array is located on the stack.

```
5   #include <stdio.h>
6
7   int main(void){
8
9   //int Array has values in ASCII format
10  int A[100];
11  A[0] = ((((117)*256 + 110)*256+97)*256+77);
12  A[1] = ((((72)*256 + 32)*256+108)*256+101);
13  A[2] = ((((117)*256 + 103)*256+108)*256+111);
14  A[3] = (((256 + 0)*256+110)*256+105);

BLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    JUPYTER

C:\Users\m2018\OneDrive\Documents\NMSU\Fall 2022\CS 471\assignments> ./progra
ay is located at:                6421904  located on the stack.
s located at:                    6421900  located on the stack
name is Manuel Holguin
C:\Users\m2018\OneDrive\Documents\NMSU\Fall 2022\CS 471\assignments>
```

Figure 2- Proof of location of array in code within the main method.

b)

```
char *S;
printf("S is located at:        %20u  located o

        //set pointer equal to the position in
        S = (char *) A;
```

```
S    OUTPUT    DEBUG CONSOLE    TERMINAL    JUPYTER

Users\m2018\OneDrive\Documents\NMSU\Fall 2022\CS 471\assignments> ./
is located at:                  6421904  located on the stack.
ocated at:                      6421900  located on the stack
e is Manuel Holguin
Users\m2018\OneDrive\Documents\NMSU\Fall 2022\CS 471\assignments>
```

Figure 3- The pointer to the array is located on the stack as shown in the image separated by 4 bytes from the array.

c)

```
//Date: 08/27/2022
//Title: Simple C aliasing Problem
#include <stdio.h>
int A[100];

int main(void){

//int Array has values in ASCII format
```

```
OBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    JUPYTER

S C:\Users\m2018\OneDrive\Documents\NMSU\Fall 2022\CS 471\assignments> ./programm
ray is located at:                  4223104  located on the stack.
 is located at:                     6422300  located on the stack
 name is Manuel Holguin
S C:\Users\m2018\OneDrive\Documents\NMSU\Fall 2022\CS 471\assignments>
```

Figure 4- Array is set as a global variable moving it to the data section instead of the stack.

d) My computer runs on little endian.

e) Reading from this blog on stack overflow it seems that little endian was made with the purpose of efficiency and optimization while big endian is useful to programmers who have to read hex dumps of data it makes it easier for those that read left to right and vice versa for little endian. From what I have read using little endian should be better as it makes for more precise calculations compared to a big-endian architecture that is purposely made to be read easier by programmers.

https://stackoverflow.com/questions/13926760/the-reason-behind-endianness

https://www.freecodecamp.org/news/what-is-endianness-big-endian-vs-little-endian/

4) No, we do not need to fill the last integer with 0's as long as the last byte is a 0's the

In the following images I show how filling up the entire last integer with '0' and only filling in the last byte does not make a difference the string is ended regardless.

```
A[3] = ((((0)*256 + 0)*256+110)*256+105);

//This is the location of the array in the Stack
printf("array is located at:    %20u  located on
```

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    JUPYTER

PS C:\Users\m2018\OneDrive\Documents\NMSU\Fall 2022\CS 471\assignments> ./pro
array is located at:                4223104  located on the stack.
S is located at:                    6422300  located on the stack
My name is Manuel Holguin
PS C:\Users\m2018\OneDrive\Documents\NMSU\Fall 2022\CS 471\assignments>
```

Figure 5- Last integer filled with '0's

```
A[3] = ((( 0)*256+110)*256+105);

//This is the location of the array in the Stack
printf("array is located at:    %20u  located on the stack.\
```

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    JUPYTER

PS C:\Users\m2018\OneDrive\Documents\NMSU\Fall 2022\CS 471\assignments> ./programming1.exe
array is located at:                4223104  located on the stack.
S is located at:                    6422300  located on the stack
My name is Manuel Holguin
PS C:\Users\m2018\OneDrive\Documents\NMSU\Fall 2022\CS 471\assignments>
```

Figure 6-last byte has only one "0" causing the String to close

Both yield the same result terminating the string after my name regardless of how many zeros are put into the last integer.