

CSC209H Worksheet: Strings

Each line of mem mode is 4 bytes, so 4 chars fit on one line

- Write a program that declares 3 strings. The first named `first` should be set to the value "Monday", and be stored on the stack frame for `main`. `second` should be a string literal with the value "Tuesday". `third` should have value "Wednesday" and be on the heap. The pointers for `second` and `third` will be in stack frame for `main`. Then beside it, draw the memory model for your program after all three strings have been created.

All string literals in the code are stored in read only memory

```
int main(void) {
    char first[] = "Monday";
    char *second = "Tuesday";
    char *third = malloc(10);
    strcpy(third, "Wednesday", 10);
}
```

array on stack initialized with the string literal

string literal

```
char *string_list[3];
string_list[0] = first;
string_list[1] = second;
string_list[2] = third;
```

Section	Address	Value	Label
Read-only	0x100	M o n d	
	0x104	a y 10	
	0x108	T u e s	
	0x10c	d a y 10	
	0x110	w e d n	
	0x114	e s d a	
	0x118	y 10	
Heap	0x23c	w e d n	
	0x240	e s d a	
	0x244	y 10	
	0x248		
	0x24c		
	0x250		
stack frame for main	0x454	M o n d	First
	0x458	a y 10	
	0x45c	0x108	second
	0x460		
	0x464	0x23c	third
	0x464		
	0x468	0x454	string-list
	0x46c		
	0x470	0x108	
	0x474		
	0x478	0x23c	
	0x47c		

because the name of the array is used as a pointer to the 0th element

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2. Add to your program so that it declares an array `string_list` of 3 pointers to char and point the elements to `first`, `second`, and `third`, respectively. So now you have an array of strings. Where is the memory allocated for this array? Add to your memory model diagram as well.
3. So far much of the allocation has happened in the function `main`. Write a new function `build_month_list` that allocates, initializes and returns an array of 3 strings with the values "January", "February", and "March". All the strings should be mutable. *see strings_sol.c*

In addition to writing the code, draw a memory diagram illustrating where values are stored immediately before `build_month_list` returns.

↳ try drawing it yourself.