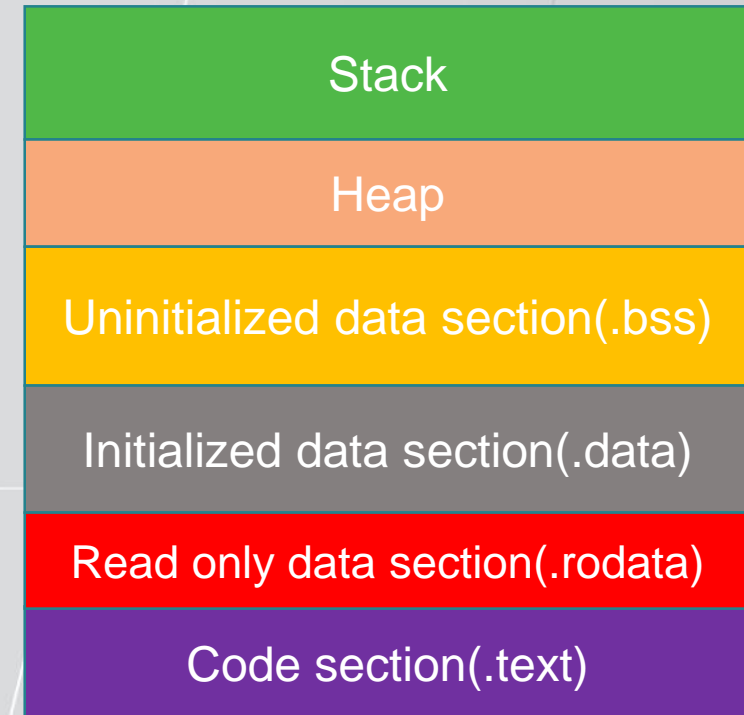


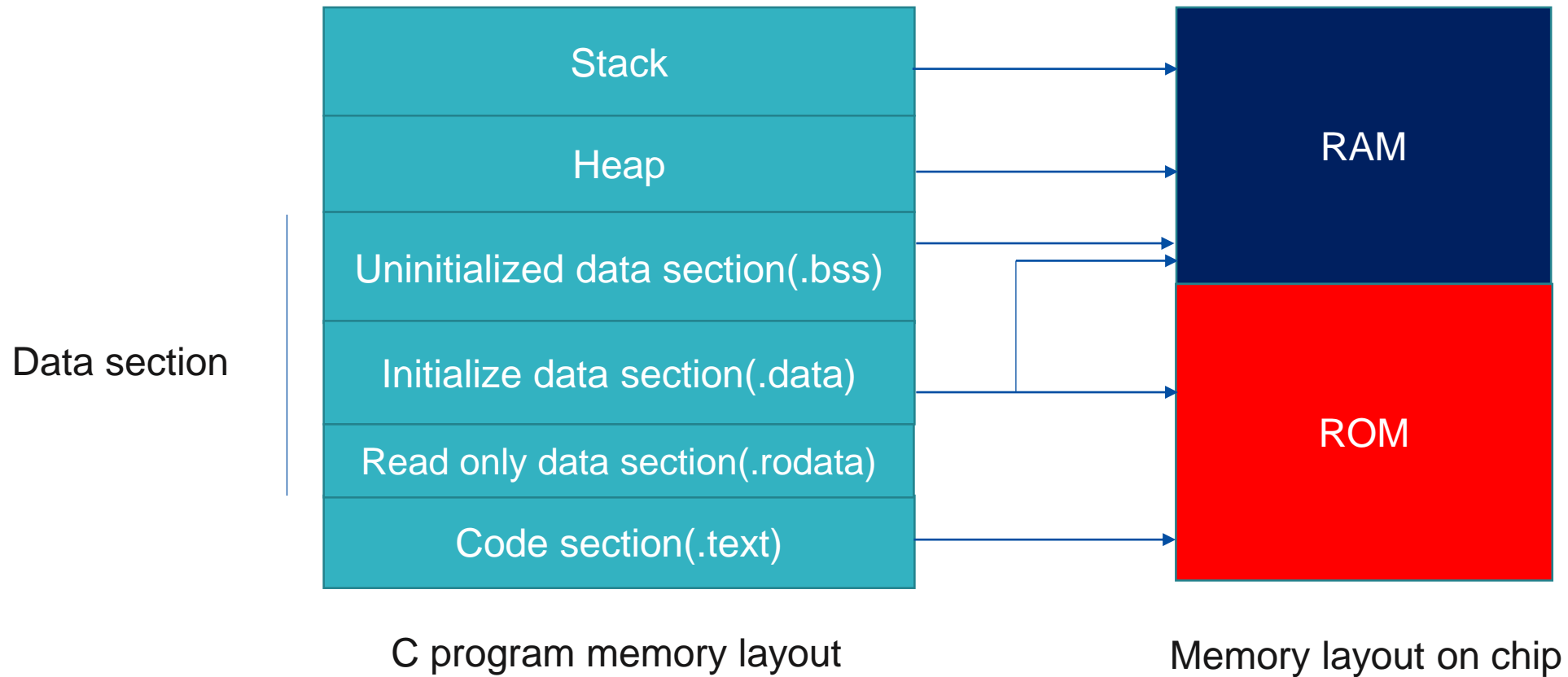
Memory Layout

18 Sep 2023

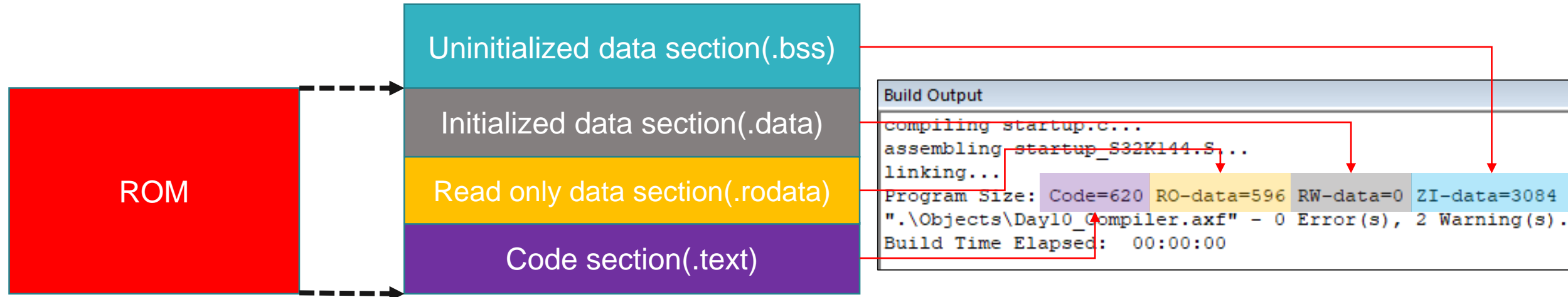


- 1. Memory Layout**
- 2. Memory Layout on ROM**
- 3. Memory Layout on RAM**
- 4. Memory Allocation**

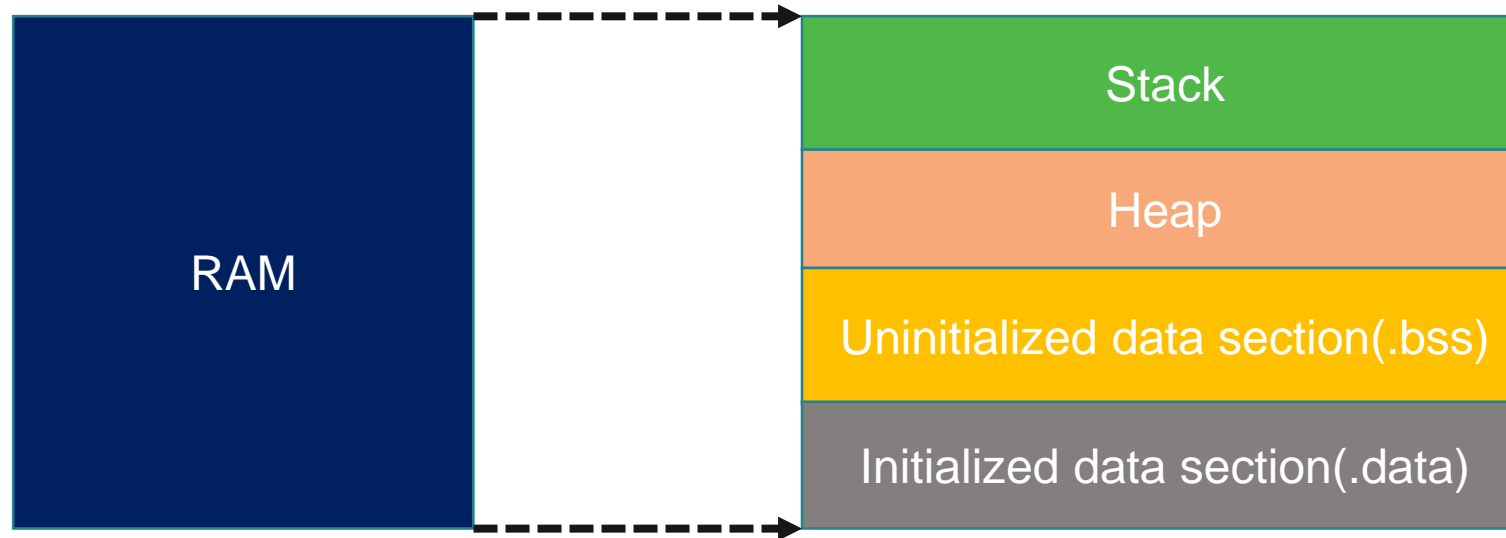
- The relation of C program memory layout and the Memory layout on chip



Memory Layout on ROM



- ❖ Code section: contain the executable instruction of the program.
- ❖ Data section divided into three parts:
 - Read only data: Store the constant global variables
 - Initialized data: Store the global variables and static variables that are initialized $\neq 0$
 - Uninitialized data: Store the global variables and static variables that are initialized to zero or do not have explicit initialization



- ❖ Stack: Store local variables, function parameters, return address.
- ❖ Heap: dynamic memory allocation. Managed by programmer.

Variable(Data)	LOAD time	RUN time	Section	Note
Global Initialized	ROM	RAM	.data / RW	Should be copied from ROM to RAM by startup code
Global Uninitialized	-----	RAM	.bss / ZI	startup code reserves space for this data in RAM and initializes to zero
Global static initialized	ROM	RAM	.data / RW	Should be copied from ROM to RAM by startup code
Global static uninitialized	-----	RAM	.bss / ZI	Startup code reserves space for this data in RAM and initializes to zero
Local initialized	-----	STACK(RAM)	-----	Consumed at run time
Local uninitialized	-----	STACK(RAM)	-----	Consumed at run time
Local static initialized	ROM	RAM	.data / RW	Should be copied from ROM to RAM by startup code
Local static uninitialized	-----	RAM	.bss / ZI	Startup code reserves space for this data in RAM and initializes to zero
All global const	ROM	-----	.rodata / RO	

A nighttime cityscape featuring a prominent skyscraper with a spire, illuminated by warm lights. The building is framed by a large, semi-transparent, stylized letter 'R' in a light purple/pink color. The city lights reflect on the water in the foreground. Other buildings and a bridge are visible in the background under a dark, cloudy sky.

Thank you