Problem 8.1 - address space in paging system

page size = 2048 B => frame size

total physical memory = 256 KiB

1 KiB = 1024 B

a) How many frames has the physical memory

$$nr\ frames = \frac{total\ size\ of\ physical\ memory}{size\ of\ a\ frame}$$

$$nr\ frames = \frac{256 \cdot 1024^1}{2048^2} = 128$$

b) How many bits has an address in the logical address space and how many bits has an address in the physical address space

max nr pages = 16

page size = 2048

total logical size = 16 · 2048

$$2^m = 16 \cdot 2048 = 2^4 \cdot 2^{11} = 2^{15}$$

$$\Rightarrow m = 15 \text{ bits}$$

total size of physical address $= 256 \cdot 1024$

$$2^m = 256 \cdot 1024 = 2^8 \cdot 2^{10} = 2^{18} \quad \Rightarrow m = 18 \text{ bits}$$

c) How many bits are used for the page nr and how many are used for the offset within a page

$$2^d = 2048 \Rightarrow d = 11$$

$$2^h = 16 \Rightarrow h = 4$$

$$h + d = m \qquad \Rightarrow 11 + 4 = 15 \qquad 15 = 15$$

Problem 8.2 – Paging and page tables