The two problems are taken from this derivation of the inclusion-exclusion principle:

http://www.proofwiki.org/wiki/Inclusion-Exclusion\_Principle#Induction\_Hypothesis

















Why can they apply the induction hypothesis to the part here as well? Have they not changed the conditions by using $A\_{i}∩A\_{r+1}$?





Where do we get to take into account the expansion of



? What does it mean? And how do they end up with the part



