

Each  $A_i$  is a finite intersection of maximal ideals  $m \subset R$  for which  $R/m$  is simple artinian. Therefore, we may as well assume that each  $R/A_i$  is simple artinian. In particular, each  $A_i$  is a maximal ideal. We may further assume that  $A_i \neq A_j$  for  $i \neq j$ .

Then  $A_i + A_j = R$  whenever  $i \neq j$ , and the Chinese Remainder Theorem implies that  $R/A \sim \prod_{i=1}^n R/A_i$  which is a semisimple ring.