

Let  $R \sim \prod_{i=1}^r M_{n_i}(D_i)$ , where the  $D_i$ 's are suitable division rings. Then  $M_n(R) \sim \prod_i M_n(M_{n_i}(D_i)) \cong \prod_i M_{nn_i}(D_i)$  which is a semisimple ring.