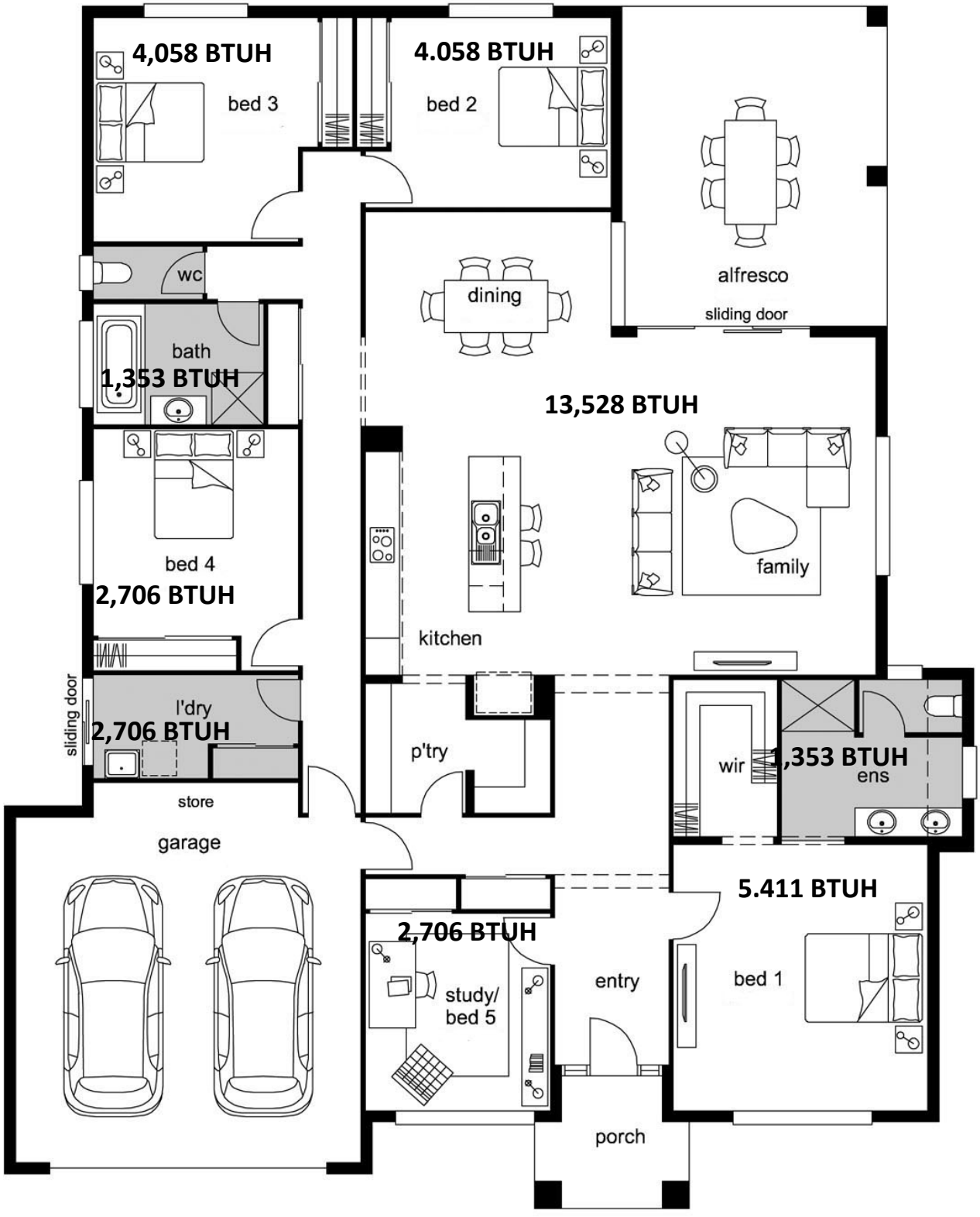
Homework #8 – Air Distribution Systems Design - ACCA Manual D

Show all work for full credit.

Due: 9/15

20 points

Name: **Solution**



The Room-By-Room Cooling Load calculation has been completed for the home used in HW#5 and the room loads are shown on the plan on the previous page.

Size of HVAC Unit Required

To calculate the required equipment size, divide the HVAC load for the entire home by 12,000. One ton equals 12,000 BTUs, so if a house or office needs 24,000 BTUs, it will take a 2-ton HVAC unit. If you get an uneven number, such as 2.33 for a 28,000 BTU load capacity, round up to a 2.5-ton unit.

From HW#5
Peak Cooling Load = 37,878 BTUH

HVAC Unit Size = 37,878 BTUH / 12,000 = 3.16 tons Round to 3.5 tons

1. Using the industry standard of 400 CFM per ton determine the required Total Ventilation Rate (CFM)

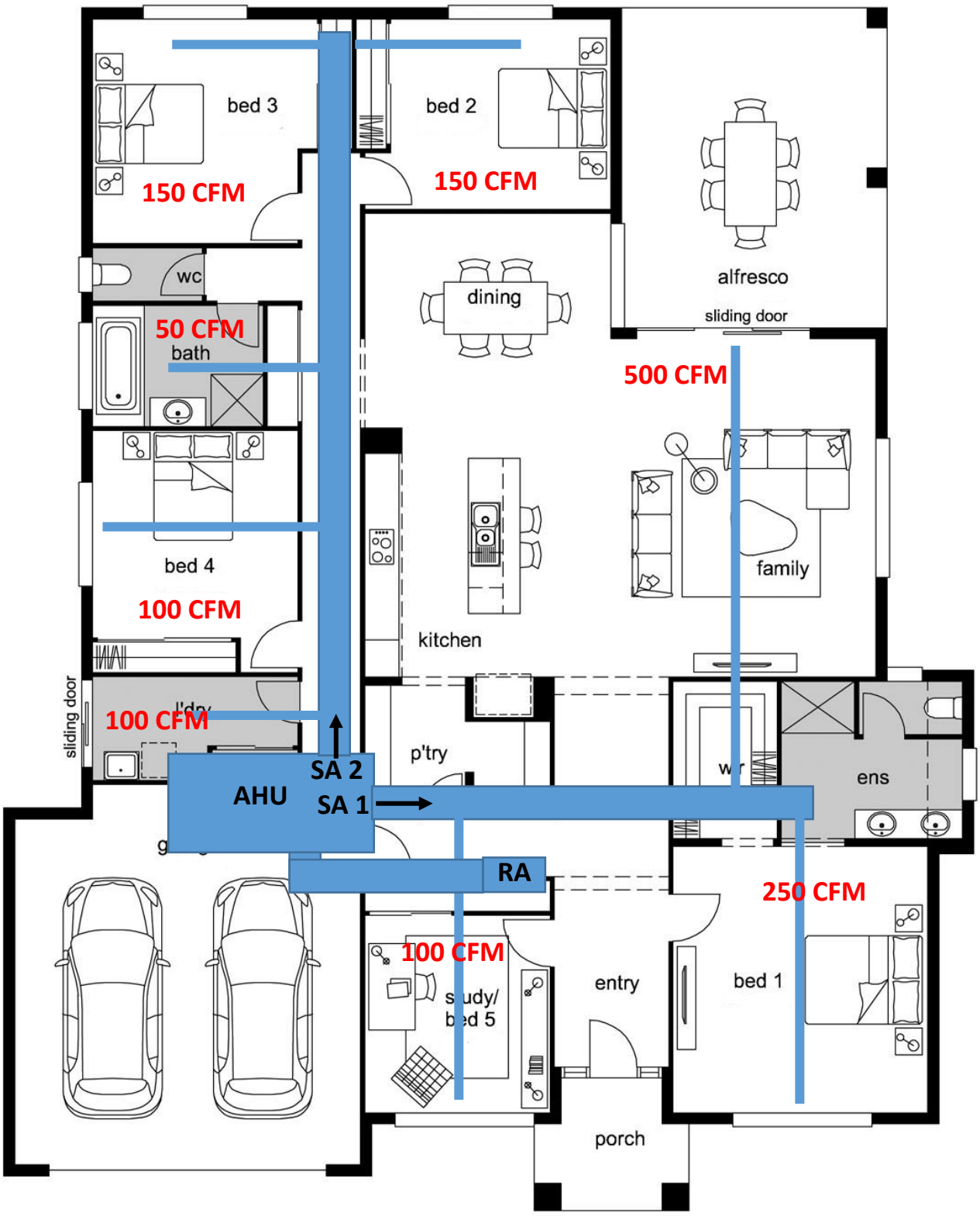
   Ventilation Rate = 3.5 tons X 400 CFM /ton = 1400 CFM

2. Using the equation shown below, calculate the required CFM per room and complete the table shown below. Round CFM to whole number.

   Room Ventilation (CFM) = [Room Heat Gain (Btuh) / Total Heat Gain (Btuh)] X Total Ventilation Rate (CFM)

Room	**Heat Gain (BTUH)**	**Required CFM**
Family, dining, kitchen	13,528	500
bed 1 / ens	5,411	250
bed 2	4,058	150
bed 3	4,058	150
bath	1,353	50
bed 4	2,706	100
l'dry	2,706	100
study/bed 5	2,706	100
Totals	33,878	1400

3. Write the required CFM for each room on the plan shown on the next page in the corresponding room.



4. Determine the total CFM as shown below:

Duct	Total CFM
Supply Air Duct (SA 1)	850
Supply Air Duct (SA 2)	550
Return Air Duct (RA)	1400