Today: Synthesis, external sorting, polyphase merging, synthesis; § 21.6, Reynolds's paper.[1]
Next class: *Posters.* Synthesis and review.
Reminders: Class participation. Use the newsgroup. Give, receive help. Discuss.

1. Write your group identifier (e.g., C3) and its members' names. Underline your name.

2. Fill in the blank entries in the following tables, indicating the number of runs on each of the five tapes used in a *polyphase merge-sort of order 4*. Row n of each table summarizes the distribution of runs on the tapes immediately following the nth merge, with the 0th row summarizing the initial distribution of runs (before any merges). Leave space in each cell to answer Question 3.

	# runs on tape				
merge	1	2	3	4	5
0	8	8	7	7	0
1					
2					
3					
4					
5					
6					
7					
8					

	# runs on tape				
merge	1	2	3	4	5
0	10	9	5	6	0
1					
2					
3					
4					
5					
6					

[1] Samuel W. Reynolds, "A Generalized Polyphase Merge Algorithm," *Communications of the ACM* 4/8 (1961).

3. Augment the entries in the tables of Question 2 by adding (parenthesized) the sizes of the sorted runs in each cell, assuming all initial runs have 1000 records.

4. Using the definition in Reynolds's paper, list the first 20 k-generalized Fibonacci numbers for $k = 2, 3, 4, 5$.

5. Using the method suggested by Reynolds's paper, determine the initial distribution of 82 runs on 6 tapes for a 5-way polyphase merge. That is, indicate the number of runs initially written to each of the tapes, numbered 1 through 6. Show the intermediate steps used in arriving at the final distribution. Then indicate the result of each merge step in tabular form, as in Question 2, until only one run remains.