**SUBUBI spec**  
 Sububi stores the following information about each teacher:  
  
    The teacher's nine digit Social Security Number. This uniquely identifies the teacher.  
    The teacher's Sububi four digit PIN.  
    The teacher's name.  
    The school at which the teacher works.  
    The grade level which the teacher teaches. The possible grades are K, 1 through 12, E (for any elementary school grade (K-6)), J (for any Junior High School grade (7-9)), H (for any High School Grade (10-12)), and A (for non-grade level related specialties such as school nurse).  
    The Social Security numbers of the last three substitutes who have substituted for the teacher in the current school year.  
    The teacher's subject, one of the following: "Home room", "Science", "math", "English", "Social Studies", "Physical Ed", and "Arts / Music", "World Language" or "Other". Upper or lower case doesn’t matter (i.e. math == Math == MATH). Subject names could be separated by commas (,) or semicolons (;)  
    A list of future dates when the teacher plans to be absent from school.

Sububi stores the following information about each substitute:  
  
    The substitutes' nine digit Social Security Number. This uniquely identifies the substitute.  
    The substitute's Sububi four digit PIN.  
    The substitute's name.  
    The substitute's phone number.  
    A list of the substitute's preferred schools.  
    A list of the substitute's acceptable schools.  
    A list of the substitute's preferred grade levels (same categories as listed for teachers).  
    A list of the substitute's acceptable grade levels.  
    A list of the substitute's preferred subjects (same categories as listed for teachers).  
    A list of the substitute's acceptable subjects.  
    A list of days of the week during which the substitute is not available, known as "black-out" days.  
    The substitute's seniority, which is the number of years the substitute has been registered with the school district.  
    The substitute's STSO rating, which is either 1, 2, or 3.  
  
The preferred and acceptable schools, grade levels, and subjects are ones for which the substitute is qualified, as determined by the school district (pursuant to Federal Court case Smith vs. School Board, all substitutes are deemed qualified for all schools). The distinction between preferred and acceptable is based on substitute preference; a substitute who is completely flexible can list all schools, grade levels, and subjects for which he or she is qualified as preferred. No school, grade level, or subject should be listed as both acceptable and preferred.  
  
Most substitutes have an STSO rating of 2. A rating of 1 indicates that the substitute is to be given special preference in selection. A rating of 3 indicates that the substitute is to be called only if no substitute rated 1 and 2 is available.  
  
The following section describes the rules SubDo follows in deciding the order in which to contact substitutes when a vacancy due to a teacher absence occurs. Substitutes are ranked for a vacancy according to the following rules.  
  
    A substitute who is already assigned to a vacancy on a particular day is not considered for another vacancy on that same day.  
    A substitute who has the day of the absence blacked-out is not considered.  
    A substitute who has filled in for the absent teacher earlier in the school year receives 50 points. If there is more than one such substitute, the one who filled in most recently receives the points and the others receive no points for that.  
    If there is no available substitute who has filled in previously for the absent teacher, compute the "match factor" as follows, and prefer the substitute with the highest match factor.  
        Add 100 points if STSO rating is 1.  
        Add 50 points if STSO rating is 2.  
        Add 10 points for each match between vacancy school, grade level, and subject, with a preferred choice of the substitute's.  
        Add 5 points for each match between vacancy school, grade level, and subject, with an acceptable choice of the substitute's.  
        Add 1 point for each year of seniority.  
  
Vacancies for the current date are considered in random order when making phone calls. For each vacancy, a ranking of substitutes is made, and the highest ranking substitute is called. If he or she does not accept the position, the process continues with the next highest ranking substitute, until one accepts or time runs out or the list is exhausted. If the substitute does not answer the phone, a second call is placed 60 seconds later. If the second call is not answered, the process continues as if the vacancy was declined.  
  
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Here is one scenario, or test case.  
  
1. Edna Smith teaches 10th grade English at Washington High. She has not been substituted for previously.  
  
2. Abigail Jones is a substitute with Washington High, 10th grade, and English all preferred, no black-out days, seniority = 6, STSO rating = 2.  
  
3. Andy Anteater is entered with Washington High and 10th grade preferred, English an acceptable subject, no black-out days, seniority = 2, STSO rating = 1.  
  
4. Edna Smith calls in absent for the next day, and Sububi ranks the two substitutes. Abigail Jones should have a match factor of 86. Andy Anteater should have a match factor of 127. Andy Anteater should be called first.