Counting (self-test)

How many?

1. **4 digit integers that start with 1 or 3 and are not a multiple of 10?**
2. **ways to arrange the letters a,b,c,d,e,e,e,e,e so that no e follows another e?**
3. **ways to put four Math books, two CS books and three Engineering books on a shelve so that books on the same topic are put together?**
4. **bit strings of length 6 that have at least 2 ones?**
5. **bit strings of length 8 that have exactly three ones, no two of which are consecutive?**

Arrangements with repeated symbols:

If there are n objects of r different types with n_1 of the first type, n_2 of the second type, ... , and n_r of the r-th type, then there are

$$\frac{n!}{n_1!n_2!\cdots n_r!}$$

different arrangements of the given n objects.