Medical Statistics (MATH38071) Exercise Sheet 5
(Treatment Allocation)

1. A randomised controlled trial is planned to compare two treatments using *simple randomisation* with an equal allocation ratio. Randomisation will use computer generated pseudo-random numbers drawn from a uniform distribution U[0,1]. A sequence of numbers generated from this distribution is given in the table below.

a) Define a rule to convert these numbers into an allocation procedure for two treatments using *simple randomisation* and apply this to the sequence of numbers below to generate a treatment allocation list for 15 patients.

Fifteen Pseudo-Random Numbers									
1.	0.563686	2.	0.677324	3.	0.709757	4.	0.864386	5.	0.871244
6.	0.179610	7.	0.101589	8.	0.496910	9.	0.543064	10.	0.875666
11.	0.961947	12.	0.603230	13.	0.210339	14.	0.475509	15.	0.189905

2. Suppose instead that the trial in question 1 had three treatments and again requires an equal allocation ratio. Define a new rule to allocate three treatments A, B & C, and apply this using the pseudo-random numbers above to generate a treatment allocation list for the first 15 patients assuming *simple randomisation*.

3. A randomised trial plans to use *block randomisation* with a block size L with N treatments and an equal number of patients M allocated to each treatment so that $L=M \times N$. Show that the number of possible unique blocks equals $\frac{L!}{(M!)^N}$.

4.
   a) Draw up a treatment allocation list for the first 15 patients for a trial comparing three interventions using *block randomisation* with a block size of three using the first digit of the random numbers listed above in sequence.
   b) How many unique blocks are there if the block size was 6 instead of 3?

5. A trial with two treatments uses *block randomisation* with a block size of 6 with an equal allocation ratio. The trial is stopped after 63 patients are recruited. Determine the probability distribution of the difference in treatment group sizes at this stopping point.

(Continued)

6. In a trial comparing two treatments for adolescent depression, cognitive behavioural therapy (CBT) is compared with drug therapy(SSRI). Patients are to allocated treatment by deterministic minimisation, using *gender* and *severity* classified as *moderate* or *severe*. After the first ten patients have been recruited and assign a treatment, the number of patients allocate to each treatment for each characteristic is given in the table below.

Male		Female		Moderate		Severe	
CBT	SSRI	CBT	SSRI	CBT	SSRI	CBT	SSRI
4	2	1	3	3	2	2	3

a. How many patients have been allocated CBT?

b. The next 5 patients entering the trial, listed in order of entry, have the following characteristics

Patient Number	Gender	Severity
11	male	moderate
12	female	moderate
13	male	moderate
14	male	severe
15	female	severe

Determine the treatment allocation for each patient.

7. In early clinical trials *alternate allocation* was sometimes used to assign treatment rather than randomisation. Why is this poor method of allocating treatment to patients in a clinical trial?