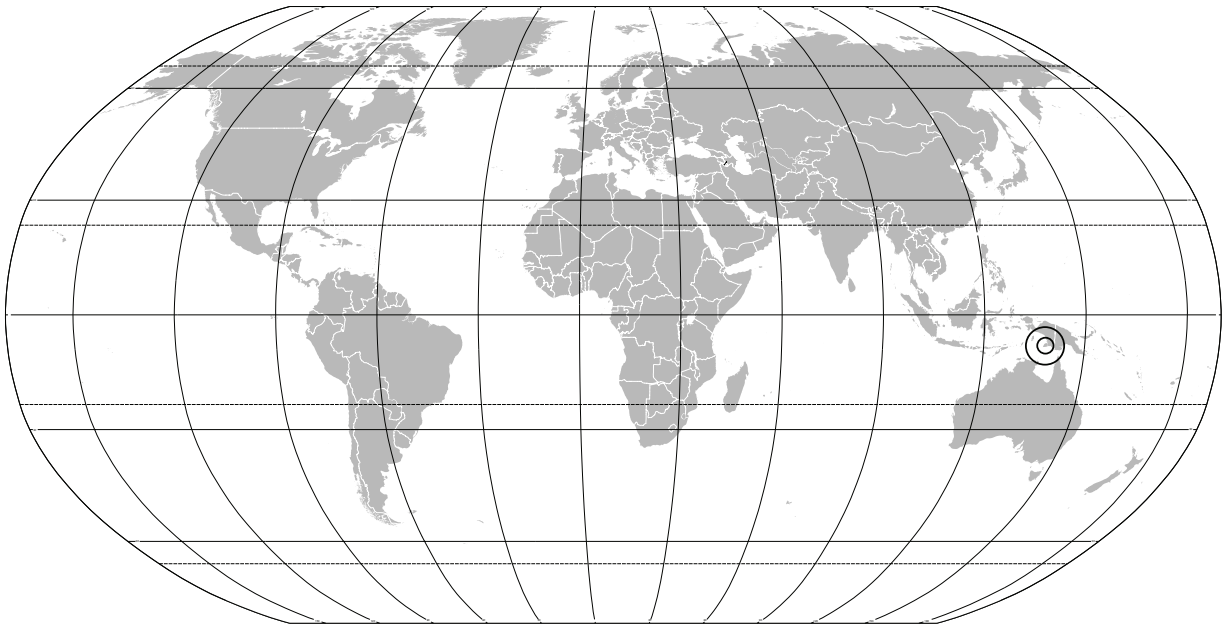
**MATH601 Spring 2008 Handout 1: Senary Arithmetic**
Unit 1: Natural Numbers

We will do all arithmetic in this unit in base six, where our digits are Z (zero), A (one), B (two), C (three), D (four), and E (five). Where necessary, write numbers in word notation; do NOT use the symbols 0,1,2,3,4,5,6,7,8,9. Instead of "digit", use the term "hand". This is appropriate because a hand may be used to easily represent values from zero to five. For this reason, high school and college basketball rules require player numbers to be in senary (and of one or two hands). For more details, see:
`nfhs.org/core/contentmanager/uploads/2007-08_NFHS_Basketball_Uniforms.pdf`
`ncaa.org/library/rules/2007/2007_m_w_basketball_rules.pdf` (Rule 3, Section 5, Article 10)

Senary arithmetic is used in the Ndom language, one of many spoken in New Guinea. For more information, and a satellite image, see:
`eosweb.larc.nasa.gov/HPDOCS/misr/misr_html/palau_yos_sudarso.html`



Exercises to complete for next class: (exercises are never collected, they are for your benefit only)

A. The natural numbers, in order, are: Z,A,B,C,D,E,AZ,AA,AB,AC,AD,AE,BZ,.... Write the next thirty natural numbers. You may wish to make a table with senary and word notation, to help in conversion (at least initially).

B. Find and practice efficient methods to convert from word notation (twenty-eight) to senary (DD) and back again. Try to write your methods as clearly as possible, so that a child or computer could employ them. Use these methods to convert seventeen, thirty-seven, fifty-nine, AA, BZZ, BAD, DAD.

C. Make an addition table in senary, and use it to calculate AA+BZZ, ABE+BEE, BAD+DAD, ABBA+BZZBZZBEE.

D. Find and practice a technique to double. Try to write your method as clearly as possible, so that a child or computer could employ it. Use this to double AA, BAD, DAD, ECABA, BZBECDE.

E. Find and practice a technique to halve (any number ending in Z,B, or D may be halved). Try to write your method as clearly as possible, so that a child or computer could employ it. Use this to halve AB, BAD, DAD, ECABZ, BZBECDD.