Assignment 2

1. *(Ahlfors, p.96, problem 1)* Find a conformal mapping which maps the intersection of the discs $|z| < 1$ and $|z - 1| < 1$ onto $|z| < 1$. Choose the mapping so that symmetries are preserved.

2. *(Ahlfors, p.179, problem 4)* As a generalization of the Hurwitz theorem, prove that if $f_n \to f$ uniformly on compact subsets of $\Omega$ and $f_n$ have at most $m$ zeros in $\Omega$ then $f$ is either identically zero, or has at most $m$ zeros.

3. *(Ahlfors, p.179, problem 5)* Prove that

$$\sum_{n=1}^{\infty} \frac{n z^n}{1 - z^n} = \sum_{n=1}^{\infty} \frac{z^n}{(1 - z^n)^2}, \quad |z| < 1.$$

4. *(Ahlfors, p.184, problem 3)* Develop $\log(\sin z/z)$ into powers of $z$ up to the term $z^6$. 