The algorithmic theory of quaternion algebras
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In this mini-course, we present the algorithmic theory of quaternion algebras as it relates to modular forms. We begin by discussing some basic computational problems for quaternion algebras over number fields. We then discuss the theory of Brandt matrices, which relate the ideal theory of a quaternion order to spaces of modular forms as Hecke modules. We then present computational aspects of Shimura curves over totally real fields and provide many explicit examples.