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MATHEMATICS

**Real Options Approach to Evaluating Capital Investment Decisions  
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The aim of my project was to explore valuation of real options in the Binomial Option Pricing framework. This approach is much more realistic in real-life situation to that of the traditional Discounted Cash-Flow technique used in finance.

I was introduced to binomial trees and how they are built. I have also learnt how different types of options (American and European) can be priced using a binomial tree. Next, I learnt about the various “real” options a firm may have embedded in their projects, such as the option to abandon a project, the option to expand a project or the option to contract a project, to name a few. I then learnt that these options can be viewed, and valued, as puts or calls using the Binomial Option Pricing Model of Cox, Ross and Rubinstein.

The implication of the real options approach to evaluating capital investment decisions is that, once real options available to a firm are identified, a non-viable project (project with negative net present value) may become a viable one after incorporating the value of these options. Hence, this method can enable a firm to make better investment decisions. This method is however not fool-proof as there are situations in which the underlying assumptions, such as tradability of the underlying asset or existence of a twin (traded) security, may not hold. To overcome this problem, there are other approaches such as the Decision Tree Analysis and approximation methods. However, these methods were beyond the scope of my project.

All in all, the summer vacation scholarship project was fun and the best bit of it was attending the Big Day In. The Big Day In showed me the vast career opportunities available. I've also enjoyed meeting new people and mathematicians and have been inspired by them. I am very thankful for the opportunity to undertake this vacation scholarship, to attend the Big Day In and to visit Sydney for the very first time in my life. I am also very grateful to my supervisor, Dr. Malgorzata Korolkiewicz for helping me in my project and in preparing the presentation.