Learning and Computational Finance and Economics
Test 2010-11

Answer ALL Questions

Question 1: Machine Learning [40%]

A program makes Boolean predictions (T or F). Its predictions were compared to the reality. The comparisons were shown in the table below.

Prediction	T	T	T	F	T	T	F	F	F	F
Reality	T	T	F	F	T	T	F	T	F	T

(a) How would you summarize the above results in a confusion matrix? [7%]
(b) What are accuracy, precision and recall of this program? Explain your answer carefully. [21%]
(c) Suppose every positive prediction (i.e. prediction of T) leads to a substantial investment in your budget. If you have a chance to improve either the precision or the recall, but not both, which would you choose to improve, and why? [6%]
(d) Suppose one randomly turns some positive predictions to negative predictions. What is the most likely impact to precision and recall? Under what situations would one want to make such changes? [6%]

Question 2: Computation and forecasting [30%]

(a) Suppose you have discovered a new indicator to forecast return (R) and a new indicator to measure risk (K). Suppose you believe that these two indicators are useful for making a certain prediction. How would EDDIE help you to use these two factors? [12%]
(b) What is meant by combinatorial explosion? [8%]
(c) Does EDDIE suffer from the combinatorial explosion problem? Justify your answer carefully. [10%]

Question 3: Economic wind-tunnels [30%]

(a) The 2002 Economics Nobel Prize winner Vernon Smith spearheaded “wind-tunnel tests” for economics. Explain what that means. How is that related to modeling? [8%]
(b) Given that real markets can never be accurately modeled, why should one be interested in modeling the market anyway? [10%]
(c) You are in charge of a project to launch a new credit card. You need to decide on the advertising budget and the fees (which could be zero or negative) that you will charge the customers and merchants who use your card. Explain how modeling the credit card market could help you. Describe any assumption that you make. [12%]