

Financial Computing

BSc (Hons)

COURSE DETAILS

- A level requirements: [AAA](#)
- UCAS code: GN34
- Study mode: Full-time
- Length: 3 years

KEY DATES

- Apply by: [31 January 2024](#)
- Starts: 23 September 2024

Course overview

Financial computing is at the very heart of the world's global financial centres, from Wall Street to Chicago, London and Tokyo. This dynamic programme will develop your knowledge and skills in all aspects of financial services.

INTRODUCTION

Study Financial Computing at Liverpool and learn to understand the underlying technology that powers modern financial markets and the financial theory that steers them.

Bringing together finance, economics and computing, this programme will develop your understanding of financial services by developing your knowledge and practical skills of algorithms; financial accounting; designing, implementing and evaluating software systems to analyse stock portfolios and operating financial markets.

Taught in conjunction with the Management School, your studies will be guided by experts in both computer science and financial services. After covering core elements in your first year, we subsequently give you the flexibility to tailor and focus your learning to your own interests or you can choose to maintain a balanced mixture of modules throughout your degree.

WHAT YOU'LL LEARN

- Financial accounting to correctly prepare statements and transactions
- Management accounting to aid planning and decision making

- Database development
 - Frame real world problems in an economic model
 - Object-orientated programming
 - Analytical techniques for problem solving
 - Digital ethics and legal aspects of computing
 - Technologies for E-commerce
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Course content

Discover what you'll learn, what you'll study, and how you'll be taught and assessed.

YEAR ONE

Year one of the programme has been designed as an even split between topics relating to computing and topics related to accounting, economics, finance and management.

In year one you will learn the fundamentals of computing, accounting, economics, finance and management. This initial broad scope will instil confidence to apply

In year one students will typically undertake either COMP101 (Introduction to Programming) or COMP105 (Programming Language Paradigms) based on prior exposure to programming (eg Computer Science A level). Students without a computer science background will normally study COMP101, however in some instances may be permitted to enrol on COMP105 instead.

All other year one modules are required.

practical techniques such as making and recording financial transactions; expand on theories such as software design methodology; management decision making and microeconomics. You will also gain an all round understanding of what is expected from a computing professional in the current digital environment.

COMPULSORY MODULES

ANALYTIC TECHNIQUES FOR COMPUTER SCIENCE (COMP116)

Credits: 15 / Semester: semester 2

Many areas of Computer Science rely on formal analytic techniques and this module presents a basic grounding in a number of these topics focusing on their role and application to computational issues. Among the topics reviewed are Linear Algebra (with particular attention to Matrix Theory); Statistical aspects; Introductory calculus including the concepts of limits, continuity, basic differentiation and integration formulae; properties of Complex Numbers. If time allows a very brief overview of the principles of Information Theory will be included. The overriding aim of this module is to present the methods discussed in the

context of practical Computer science, and as such the emphasis will be on instilling confidence in applying techniques and not on providing rigorous supporting justifications of their validity.

DESIGNING SYSTEMS FOR THE DIGITAL SOCIETY (COMPI07)

Credits: 15 / Semester: semester 1

This module will provide students with an all rounded appraisal of what is expected from a computing professional in the current digital society. Students will be introduced to social, legal and ethical aspects on computing and will develop employability skills. As a way to blend both theory and practice, students will be equipped with concepts and techniques for designing digital systems tailored to the needs of the user.

INTRODUCTION TO FINANCIAL ACCOUNTING (ACFI101)

Credits: 15 / Semester: semester 1

ACFI101 aims to develop a sound understanding of the fundamental principles and techniques of financial accounting. The context and purpose of financial statements is introduced, after which students are introduced to the techniques of recording financial transactions, adjusting financial records and preparing basic financial statements. Successful students will possess a sound base of knowledge for progression towards studying financial reporting in greater depth in the second and final years: the preparation of complex financial statements in conformity with International Financial Reporting Standards (IFRS), both for single entities and groups of companies, and for entities undertaking a wide range of accounting transactions. This module is delivered by means of lectures and tutorials, supported by online self-study question material. The assessment is conducted via two mid-term tests (30%) and a final exam (70%).

INTRODUCTION TO MANAGEMENT ACCOUNTING (ACFI102)

Credits: 15 / Semester: semester 2

The aim of this module is to introduce students to the nature and purpose of management accounting and to establish a solid foundation in its fundamental techniques. The module will explore and apply a range of basic techniques to produce information that aids management decision making. The techniques covered include cost volume profit analysis, budgeting and investment appraisal. Throughout the module the techniques studied will be applied to contemporary issues in the commercial world.

INTRODUCTION TO FINANCE (ACFI103)

Credits: 15 / Semester: semester 2

This module introduces students to fundamental concepts in finance. The course aims to provide a firm foundation for the students to build on later on in the second and third years of their programmes, by covering basic logical and rational analytical tools that underpin financial decisions. The course covers topics such as the structure of firms and time value of money. Building on these notions, we then discuss the valuation of simple securities such as bonds and equities. The course also introduces students to project appraisal techniques.

OBJECT-ORIENTED PROGRAMMING (COMP122)

Credits: 15 / Semester: semester 2

The intention of COMP122 is to introduce students to the concepts and methodology of object-oriented programming using the Java programming language. Topics covered include hierarchical structures, polymorphism, collections and iterators, exception handling, and graphical user interface design. Basic concepts of software design methodology, testing, and version control are also included in the module. It is normally expected that students have prior programming experience.

PRINCIPLES OF MICROECONOMICS (ECON121)

Credits: 15 / Semester: semester 1

The module acquaints the student with a foundation in neo-classical microeconomics. The module equips students with the knowledge and mathematical tools to approach fundamental problems in microeconomic analysis. Students are introduced to the importance of theoretical models and their role. The module is supported by a customized textbook. Students who engage fully with this course will receive a solid foundation in microeconomics, which forms the foundation of all future courses in microeconomics and related subjects.

OPTIONAL MODULES

INTRODUCTION TO PROGRAMMING (COMP101)

Credits: 15 / Semester: semester 1

The module provides an introduction to procedural programming using current language platforms. The module incorporates program design, problem solving, the importance of maintainable, robust software and testing as well as introducing procedural language main programming constructs. Students gain practical experience with program design, programming and testing during weekly laboratory sessions.

PROGRAMMING LANGUAGE PARADIGMS (COMP105)

Credits: 15 / Semester: semester 1

This module is for students that already have some programming skills. Students will learn about the two main programming paradigms: imperative programming and functional programming. Since most introductory programming courses teach imperative programming, this module will focus on the functional paradigm. Students will learn how to program in Haskell, a popular functional programming language. They will learn how to formulate programs in a functional way, and the common techniques and idioms that are used to solve problems in functional programming.

Programme details and modules listed are illustrative only and subject to change.

YEAR TWO

In year two you continue with a mix of modules related to computing, accounting, economics, finance and management but also have the opportunity to specialise in certain subject areas of your choice.

You will continue to develop your knowledge from your first year of study by

being introduced to more complex and advanced theories and techniques whilst at the same time expanding upon already established standards and concepts. You will look to use real market data wherever possible to make theory come to life.

You will take all the compulsory modules listed, and select modules from the optional module list.

COMPULSORY MODULES

COMPUTER-BASED TRADING IN FINANCIAL MARKETS (COMP226)

Credits: 15 / Semester: semester 2

The last few decades has seen a huge transformation in finance, where human traders have been increasingly replaced by algorithms. The aims of COMP226 are to:

- Provide an understanding of financial markets at the level of individual trades;
- Provide an overview of computer-based trading applications;
- Introduce key issues with the use of market data;
- Develop a practical understanding of the development of algorithmic trading strategies.

CORPORATE FINANCIAL MANAGEMENT FOR NON-SPECIALIST STUDENTS (ACFI213)

Credits: 15 / Semester: semester 1

The module aims to introduce students to the modern theory of finance and financial management. Theoretical concepts like the net present value, decision making under uncertainty, dividend valuation, bond pricing, portfolio theory, asset pricing, futures and options are introduced. In all cases numerical examples, using real market data, will be used to make theory come to life.

DATABASE DEVELOPMENT (COMP207)

Credits: 15 / Semester: semester 1

This module introduces students to the problems arising from databases, including concurrency in databases, information security considerations and how they are solved; the integration of heterogeneous sources of information and the use of semi-structured data; non-relational databases and the economic factors involved in their selection and to techniques for analysing large amounts of data, the security issues and commercial factors involved with them.

GROUP SOFTWARE PROJECT (COMP208)

Credits: 15 / Semester: semester 2

Software development skills form a fundamental part of the professional expertise of a Computer Scientist. Often the development is a team activity. The module provides the students with the unique opportunity to complete a sizeable software development project working as part of team.

FINANCIAL REPORTING 1 (ACFI201)

Credits: 15 / Semester: semester 1

This module develops students' knowledge from first year study by introducing more complex accounting standards which enables them to prepare complete single entity financial statements or extracts thereof. The module introduces accounting concepts and ethical issues and begins to develop students critical thinking in this area.

SECURITIES MARKETS (ECON241)

Credits: 15 / Semester: semester 2

This module seeks to provide students with an understanding of the role of securities markets in the global economy. This will be achieved through a presentation of their basic mechanisms and technical features, an explanation of the valuation of certain financial assets and an assessment of the operational and allocative efficiency of the markets. The module will be delivered via weekly small group face to face sessions and through weekly online lectures delivered asynchronously. Students will be directed to various media resources relevant to their day to day following and awareness of the activities of the global financial markets.

SOFTWARE ENGINEERING I (COMP201)

Credits: 15 / Semester: semester 1

This module deals with the issues associated with the analysis, design, implementation and testing of significant computing systems (that is, systems that are too large to be designed and developed by a single person).

OPTIONAL MODULES

ACCOUNTING THEORY (ACFI202)

Credits: 15 / Semester: semester 2

Credits: 15 / Semester: semester 2

This module aims to increase students' knowledge of financial accounting theory and its relevance to accounting practice. The module examines market for accounting information; processes and effects of regulating financial reporting; the incentives which drive managers' choices of alternative accounting policies; unregulated financial reporting, capital markets' response to accounting information; the critical perspectives of accounting and also considers a number of other important issues in financial reporting. Upon successful completion of this module, students should develop a good understanding of the role of financial accounting theory and its importance for accounting practice and reporting.

BUSINESS IN THE GLOBAL ECONOMY (MKIB225)

Credits: 15 / Semester: semester 2

Business strategies and behaviour are part and parcel of dynamic interactions between a wide range of actors in the world economy. This module aims at producing the basic knowledge and skills for understanding that interaction, taking into consideration firms but clearly examining also other types of actors such as states, international organisations, labour and social movements. It does so by asking three sets of interrelated questions. Firstly, why do businesses internationalise their operations? What, and in relation to whom, can they gain from doing so? Secondly, how do transnational corporations operate across borders? How do these operations contribute to patterns of international development? Are these patterns smooth and harmonious (simple globalisation) or uneven? Thirdly, what is the current (and future) context in which transnational enterprise takes place? Recently, the 2007–09 global economic and financial crisis, the 4th Industrial Revolution, the climate change crisis and the global health crisis have transformed the dynamics of the world economy in a number of ways, and the module aims at enhancing knowledge of this new context of business. The module will also consider key phenomena ranging from the role of the BRIC economies in the future international economic order to gender. Throughout the module, we will consider political (power) and ethical issues, as they are fundamental to understanding the world economy, past, present and future.

COMPUTER AIDED SOFTWARE DEVELOPMENT (COMP285)

Credits: 7.5 / Semester: semester 2

This module covers the theory and practice of the application of tools to the software development lifecycle

SCRIPTING LANGUAGES (COMP284)

Credits: 7.5 / Semester: semester 2

COMP284 'Scripting Languages' is one of several technical skills/employability skills modules offered in the second semester of the second year of study. It addresses both the demand by employers and the desire of students that students should encounter a range of

programming languages during their studies and should be able to use these programming languages productively. Scripting languages have gained enormously in their popularity with the expansion and development of the world wide web technologies as they are now the predominant languages used in the development of web applications. The module will cover two scripting languages, namely, JavaScript and PHP. At the end of the module students should be able to develop applications, both web-based and computer-based, in them.

Programme details and modules listed are illustrative only and subject to change.

YEAR THREE

A major part of your studies in year three will be the Honours Year Automated Trading Project that you take part in as a member of a team. This project allows you to demonstrate practical competence in both You take all the compulsory modules listed, and you will also choose modules from the selected optional modules list.

research and development of computer-based trading strategies utilising everything learned across the programme.

COMPULSORY MODULES

FINANCIAL RISK MANAGEMENT (ACFI342)

Credits: 15 / Semester: semester 2

The module on Financial Risk Management covers both the internal aspects of financial institutions and the external factors that affect the investment arena and modern financial markets in general. The degree provides an in-depth understanding of the theoretical foundations that underpin modern investment and risk management techniques. The course has a strong practical dimension so you can acquire a sound knowledge of how to apply these techniques to equity and credit markets as well as investment strategies in general.

INTRODUCTION TO COMPUTATIONAL GAME THEORY (COMP323)

Credits: 15 / Semester: semester 1

This module is an introduction to the area of algorithmic game theory, which is a novel area in the intersection of economics and computer science. It provides tools for dealing with and analysing problems related to applications motivated by the Internet. Examples involve various Internet auctions and e-commerce systems, like, Google's sponsored search, Ebay auctions, recommendation systems, etc.

BUSINESS FINANCE (ACFI304)

Credits: 15 / Semester: semester 1

The module provides students with a fundamental understanding of the core theoretical and empirical aspects involved in corporate finance (such as bond/stock valuation, capital structure, dividend policy and leasing contracts). The module will be delivered both in lectures and tutorials. Assessment is done via a mid-term test and a final written exam.

OPTIONAL MODULES

COMPUTATIONAL GAME THEORY AND MECHANISM DESIGN (COMP326)

Credits: 15 / Semester: semester 2

In this module we introduce and study games that have some underlying network structure or that appear in auctions. A focus will be on scheduling and routing, as well as on the computational aspects in the design of mechanisms and auctions.

CORPORATE REPORTING AND ANALYSIS (ACFI302)

Credits: 15 / Semester: semester 2

This module is the final module of a stream of 4 that cover financial reporting. This module therefore develops students understanding of financial reporting to a very high level by building upon the knowledge and skills gained in earlier financial reporting modules by covering more detailed and complex accounting standards. It will also develop an understanding of financial statement analysis using financial reporting and business strategy skills developed in this and earlier modules. Ethical and professional issues in financial reporting will also be considered.

THE DIGITAL BUSINESS (EBUS301)

Credits: 15 / Semester: semester 1

Technology and especially the Internet is an essential tool for the modern business providing important connections to their customers and suppliers. However, it isn't simply a case of deploying these technologies and hoping for benefit, you need to appreciate the possibilities they open up and align these possibilities to your organisational strategy. This module will open up the world of technology and its impact on business. The first half of the module will introduce the kind of technologies you are likely to meet in business and how they are being used currently. The module will then go on to explore concrete examples of e-business to examine how the student may exploit this opportunity in the future.

FINANCIAL REPORTING 2 (ACFI309)

Credits: 15 / Semester: semester 1

This module is designed to build upon the knowledge and skills gained in earlier financial reporting modules by covering the preparation of group financial statements including associates and joint ventures. It will also develop an understanding of group accounting

principles and issues arising from group accounting including fair values, intangibles and impairment. The module also addresses other key accounting standards including those relating to leases, borrowing costs and related parties. The module should enable students to prepare complete single entity and consolidated financial statements, and extracts from those financial statements, covering a wide range of International Financial Reporting Standards (IFRS). Students will also be required to explain accounting and reporting concepts and ethical issues, and the application of IFRS to specified single entity or group scenarios.

GLOBAL STRATEGIC MANAGEMENT (MKIB351)

Credits: 15 / Semester: semester 2

This module gives students an up-to-date coverage of global strategy and hands-on experience putting theory into practice. It sets new approaches such as institutional analysis alongside more traditional approaches based in economics and management. It also gives considerable attention to competition in and from emerging economies. At the end of the module, students are able to critically analyse the challenges and opportunities that a multinational enterprise (MNE) faces and the context in which these organizations make decisions. Assessment is through an individual report submitted at the end of the module.

MULTI-AGENT SYSTEMS (COMP310)

Credits: 15 / Semester: semester 2

Multi-agent systems have emerged as one of the most important areas of research and development in information technology in the 1990s. A multi-agent system is one composed of multiple interacting software components known as agents, which are typically capable of co-operating to solve problems that are beyond the abilities of any individual member. Multi-agent systems are important primarily because they have been found to have very wide applicability, in areas as diverse as industrial process control and electronic commerce. This module will begin by introducing the student to the notion of an agent, and will lead them to an understanding of what an agent is, how they can be constructed, and how agents can be made to co-operate effectively with one another to solve problems.

OPTIMISATION (COMP331)

Credits: 15 / Semester: semester 1

This module is an in-depth tour over optimisation methods applied for various optimisation models. These methods are extensively used in both academic and industrial practices.

SOFTWARE ENGINEERING II (COMP319)

Credits: 15 / Semester: semester 1

The overall aim of this module is to introduce students to a range of advanced, near-research level topics in contemporary software engineering. The actual choice of topics will depend upon the interests of the lecturer and the topics current in the software engineering area.

research literature at that time. The course will introduce issues from a problem (user-driven) perspective and a technology-driven perspective where users have new categories of software problems that they need to be solved, and where technology producers create technologies that present new opportunities for software products. It will be expected that students will read articles in the software engineering research literature, and will discuss these articles in a seminar-style forum.

Programme details and modules listed are illustrative only and subject to change.

HOW YOU'LL LEARN

Teaching is by a mix of formal lectures, small group tutorials and supervised laboratory-based practical sessions. Students also undertake individual and group projects. Key problem solving skills and employability skills, like presentation and teamwork skills, are developed throughout the programme.

HOW YOU'RE ASSESSED

The main modes of assessment are through a combination of coursework and examination. Depending on the modules taken you may encounter project work, presentations (individual or group), and specific tests or tasks focused on solidifying learning outcomes.

LIVERPOOL HALLMARKS

We have a distinctive approach to education, the Liverpool Curriculum Framework, which focuses on research-connected teaching, active learning, and authentic assessment to ensure our students graduate as digitally fluent and confident global citizens.

Careers and employability

Liverpool's computer science graduates go onto well-paid graduate jobs and careers such as: computer programmer; software developer; systems analyst; software engineer; technical consultant; web designer.

87% OF COMPUTER SCIENCE STUDENTS FIND THEIR MAIN ACTIVITY AFTER GRADUATION MEANINGFUL.

Graduate Outcomes, 2018-19.

Computer science graduates are among the highest-earners globally: there is a huge demand from industry for computer and web developers. In 2016, six out of the 10 best performing global companies had a

RECENT EMPLOYERS

- BAE Systems
- BT
- Guardian Media Group

programmers, data scientists, artificial intelligence researchers, systems analysts, software engineers, technical consultants

focus on information technology.

- Royal Bank of Scotland
- Siemens
- Unilever

PREPARING YOU FOR FUTURE SUCCESS

At Liverpool, our goal is to support you to build your intellectual, social, and cultural capital so that you graduate as a socially-conscious global citizen who is prepared for future success. We achieve this by:

- Embedding employability within your curriculum, through the modules you take and the opportunities to gain real-world experience offered by many of our courses.
- Providing you with opportunities to gain experience and develop connections with people and organisations, including

student and graduate employers as well as our global alumni.

- Providing you with the latest tools and skills to thrive in a competitive world, including access to Handshake, a platform which allows you to create your personalised job shortlist and apply with ease.
 - Supporting you through our peer-to-peer led [Careers Studio](#), where our career coaches provide you with tailored advice and support.
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Fees and funding

Your tuition fee covers almost everything, but you may have additional study costs to consider, such as books, specialist equipment or field trips.

TUITION FEES

UK fees (applies to Channel Islands, Isle of Man and Republic of Ireland)	
Full-time place, per year	£9,250
Year in industry fee	£1,850
Year abroad fee	£1,385

International fees	
Full-time place, per year	£25,750
Year in industry fee	£1,850
Year abroad fee	£12,875

Fees stated are for the 2023-24 academic year and may rise for 2024-25.

Tuition fees cover the cost of your teaching and assessment, operating facilities such as libraries, IT equipment, and access to academic and personal support. [Learn more about tuition fees, funding and student finance.](#)

ADDITIONAL COSTS

We understand that budgeting for your time at university is important, and we want to make sure you understand any course-related costs that are not covered by your tuition fee. This could include buying a laptop, books, or stationery.

Find out more about the [additional study costs](#) that may apply to this course.

SCHOLARSHIPS AND BURSARIES

We offer a range of scholarships and bursaries to help cover tuition fees and help with living expenses while at university.

[Scholarships and bursaries you can apply for from the United Kingdom](#)

Entry requirements

The qualifications and exam results you'll need to apply for this course.

AAA incl. A-level Maths or Computer Science. BTEC D*D*D* plus A-level Maths or Computer Science. If A-level Maths isn't

taken, require GCSE Maths Grade A (7) or above.

Your qualification	Requirements About our typical entry requirements
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	AAA including Maths or Computer Science Applicants with the Extended Project Qualification (EPQ) are eligible for a reduction in grade requirements. For this course, the offer is AAB with an A in the EPQ.
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<p>Your qualification</p>	<p>Narrowly missed the entry requirements on results day? Requirements If you've studied these subjects, we may take them into account.</p>
<p>A levels</p>	<p>Applicants with the Extended Project Qualification (EPQ) are eligible for a reduction in grade requirements. For this course, the offer is AAB with A in the EPQ.</p> <p>You may automatically qualify for reduced entry requirements through our contextual offers scheme.</p> <p>If you don't meet the entry requirements, you may be able to complete a foundation year which would allow you to progress to this course.</p> <p>Available foundation years:</p> <ul style="list-style-type: none"> • Computer Science BSc (Hons) (Foundation) (4 year route with Carmel College)
<p>GCSE</p>	<p>4/C in English and 4/C in Mathematics</p>
<p>Subject requirements</p>	<p>For applicants from England: For science A levels that include the separately graded practical endorsement, a "Pass" is required.</p> <p>Applicants with the Extended Project Qualification (EPQ) are eligible for a reduction in grade requirements. For this course, the offer is AAB with an A in the EPQ.</p>

<p>BTEC Level 3 Subsidiary Diploma</p>	<p>Acceptable at grade Distinction* (any subject) alongside AA at A level. A Levels must include Mathematics or Computer Science.</p>
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Your qualification	Requirements
BTEC Level 3 National Extended Diploma	D*D*D* plus A level Maths or Computer Science. If A level Maths isn't taken, require GCSE Maths Grade A (7) or above.
International Baccalaureate	36 overall including 5 in Higher Level Mathematics or Computer Science.
Irish Leaving Certificate	Irish Leaving Certificate: H1,H1,H2,H2,H2,H2 including H1 in Higher Maths. We also require a minimum of H6 in Higher English or O3 in Ordinary English
Scottish Higher/Advanced Higher	Acceptable on the same basis as A levels
Welsh Baccalaureate Advanced	Acceptable at grade A alongside AA at A level including Maths or Computer Science.
Cambridge Pre-U Diploma	Principal subjects acceptable in lieu of A levels. D3 in Cambridge Pre U Principal Subject is accepted as equivalent to A-Level grade A M2 in Cambridge Pre U Principal Subject is accepted as equivalent to A-Level grade B Global Perspectives and Short Courses are not accepted.

Access	Considered if taking a relevant subject. 45 Level 3 credits at Distinction, including 15 Level 3 credits in Mathematical or Computer Science subjects is required. GCSE English and Mathematics grade C/grade 4 or above also required.
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<p>Your qualification</p> <p>International qualifications</p>	<p>Requirements</p> <p>Many countries have a different education system to that of the UK, meaning your qualifications may not meet our entry requirements. Completing your Foundation Certificate, such as that offered by the University of Liverpool International College, means you're guaranteed a place on your chosen course.</p>
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ALTERNATIVE ENTRY REQUIREMENTS

- If your qualification isn't listed here, or you're taking a combination of qualifications, [contact us](#) for advice
 - [Applications from mature students](#) are welcome.
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THE ORIGINAL

REDBRICK