The Computer Science Undergraduate Scholarship was established in 2000 to identify outstanding students and enable them to have direct placement into advanced classes. It is funded by the School of Computing and Mathematical Sciences at the University of Waikato and up to 10 scholarships are awarded annual based on funding available and excellence of applicants. Two possible pathways exist to receive an offer of this scholarship: 1) excelling in the annual Scholarship examination, and 2) excelling in a competition run by the School of Computing and Mathematics. Most offers are based on excellence in the examination which tests knowledge of computing and skill at programming. The examination is set at a level roughly equivalent to that of the practical programming tasks and final exam of the first-year paper *Introduction to Programming*, with the exception that tasks can be performed in a programming language of the applicant's choice. For any queries regarding the examination or competition pathway, please contact cs-scholarships@waikato.ac.nz.

1.   Purpose

1.1. The Computer Science Undergraduate Scholarship serves two purposes. The first is to identify excellent students to whom scholarships can be awarded. The second is to identify students for whom direct placement into advanced classes may be appropriate.

2.   Eligibility and Selection Criteria

2.1. **To be eligible,** applicants must:

2.1.1.   be currently enrolled in either Year 12 or Year 13 at a New Zealand secondary school;

2.1.2.   be intending to enrol full-time (a full-time academic year comprises 120 points) in one of the following undergraduate degrees at the University of Waikato for the first time in the year of tenure[1]:

- BCompSc;
- BSc(Hons) majoring in Computer Science;
- BE(Hons) majoring in Software Engineering;
- BAppComp;

2.1.3.   be eligible for domestic fees status (i.e., be a NZ Citizen, NZ Permanent Resident, NZ Resident Class Visa holder, or Australian Citizen/Permanent Resident domiciled in NZ) or an international student

2.2. To be eligible to apply **via the examination pathway**, applicants must:

2.2.1.   be proficient in computer science, and ready to sit a comprehensive examination.

2.3. To be eligible to apply **via the competition pathway**, applicants must:

2.3.1.   Excel in a competition run by the School of Computing and Mathematical Sciences.

2.3.2.   Be invited to apply via the competition pathway by the Head of Computing and Mathematical Sciences.

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[1] Candidates who have undertaken **Unistart** papers at the University of Waikato are ***not*** excluded by this clause.

2.4. **Selection is based on:**

    2.4.1. Examination results of those participating in the Computer Science Undergraduate Scholarship examination.

    2.4.2. Excelling in a competition run by the School of Computing and Mathematics, and recognized through an invitation to apply by the Head of Computing and Mathematical Sciences.

    2.4.3. Applicants who show sufficient proficiency in the subject may also merit placement in more senior papers.

2.5. **To maintain eligibility,** students offered the Scholarship must:

    2.5.1. by the withdrawal deadline of A Trimester in the year following application, meet entry requirements and be accepted into one of the undergraduate degrees listed under clause 2.1.2; and

    2.5.2. enrol full-time in the year of tenure (i.e., 120 points, usually eight papers).

    2.5.3. For further information on enrolment, please refer to the School of Computing and Mathematical Sciences website.

3. Value, Tenure and Awarding

3.1. Each recipient will receive **$5,000** paid in two equal cash instalments paid directly to the recipient, subject to the recipient maintaining eligibility (refer to clause 2.3).

    3.1.1. $2,500 will be paid after the withdrawal deadline for A Trimester.

    3.1.2. $2,500 will be paid after the withdrawal deadline for B Trimester conditional on the recipient passing all A Trimester papers.

3.2. The Scholarship will have a tenure of one year. Recipients may apply to defer the award of the Scholarship for one year using the Scholarship Variation Request form. This is usually appropriate for recipients taking the exam in Year 12.

3.3. Successful applicants will be advised of the offer of a scholarship via their MyWaikato portal and must accept the offer by the prescribed date or the offer will lapse. In accepting the Scholarship, the recipient:

    3.3.1. will be deemed to have read, understood, and accepted the conditions of the Scholarship and the Scholarships Policy.

    3.3.2. agrees to participate in any publicity concerning the Scholarship arranged by the University of Waikato.

4. Application and Examination

4.1. The closing date for online applications is **5 September for 2025 (Normally 15 September each year).**

4.2. For any queries regarding the examination or competition pathway contact cs-scholarships@waikato.ac.nz.

4.3. As a part of the online application process, all applicants must provide information on the following:

    4.3.1. The undergraduate qualification the applicant intends to enrol in at the University of Waikato;

    4.3.2. The programming languages the applicant has worked with in the past;

4.3.3. The programming language the applicant will use in the exam;

4.3.4. The level of NCEA Technology/Computer Programming the applicant has studied (e.g. NCEA Level 2);

4.3.5. A Computer Teacher Confirmation form which is to be completed by the applicant's computing teacher (The school will be contacted directly by the University to obtain the form. However, the applicant must also make their school aware of this impending report).

4.4. For those **applying via the competition pathway** upload under "other documents" proof of the invitation to apply and proof of identity (e.g., School ID, Driver's Licence, or other form of official photo ID).

4.5. For those **applying via the examination pathway**:

4.5.1. The Computer Science Undergraduate Scholarship examination will be held on **1 November 2025.**

4.5.2. The examination is a five-hour practical examination (see appendix 1 for the outline of the practical examination). At the discretion of the University, a short follow-up interview may be conducted.

4.5.3. The practical examination will normally be conducted and supervised by the applicant's school, but, if necessary, may be conducted online with agreement from the School of Computing and Mathematical Sciences.

   a. In each case, applicants will either use a school computer or their own computer for the practical work.

   b. If the applicant undertakes the practical examination online, the candidate will work on their own computer with a Zoom video and audio connection open throughout the entire examination period. The Zoom connection will be set to 'share' a view of the applicant's screen to show their working. The University may record the Zoom session.

4.5.4. Applicants must present the proof of identity (e.g., school ID, Driver's License, or other form of official photo ID) at the examination.

5. Selection Panel

5.1. The Selection Panel will comprise the Division of Health, Engineering, Computing and Science representative on the Scholarships Committee (in the Chair), the Head of the School of Computing and Mathematical Sciences (or nominee), and the Chairperson of the Department of Computer Science (or nominee).

5.2. The Selection Panel's decisions are final and no correspondence will be entered into following the selection meeting.

5.3. If the scholarship is declined, or not taken up, the Selection Panel may offer it to a reserve applicant.

6. Other Conditions

6.1. If a recipient is in receipt of a student allowance, another scholarship, or any type of financial assistance, it is their responsibility to check their entitlement to other income and any tax implications.

6.2. Recipients must remain enrolled full-time for the period of tenure. Should a recipient withdraw from any papers, without adding sufficient papers to maintain an overall enrolment in a minimum of 120 points for the academic year, the University may ask for the Scholarship to be repaid.

6.3. The Scholarship may be held with any other scholarship, award, or bursary, unless the conditions of the other award preclude this.

6.4. Through the School of Graduate Research and Student Services Division, the University monitors students' performance and reserves the right to impose further conditions where a student's conduct is unsatisfactory.

6.5. The Scholarships Committee may terminate this Scholarship at any time, and recoup any funds disbursed, if the holder withdraws from the University of Waikato, brings the Scholarship or the University into disrepute[2] or is otherwise not complying with the conditions governing the Scholarship and/or the regulations of the University of Waikato. The holder of a Scholarship shall have the right to appeal to the Scholarships Executive against any decision to terminate the Scholarship.

6.6. International scholars must comply with the conditions of their Immigration New Zealand (INZ) Student Visa.

6.7. The Scholarships Committee has the power to amend or vary these regulations, provided that there is no departure from the main purpose of the Scholarship.

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[2] See Code of Student Conduct.

APPENDIX 1

Examination Syllabus

Aims and Objectives

The aims of the Scholarship are to enable high school students to:

- Develop an understanding of the nature and principles of computing

- Develop an understanding of methods of analysing problems and practice the application of such methods

Before taking the Scholarship examination, students should be able to:

- Understand, apply and use appropriate terminology, concepts, processes and techniques of computing

- Construct a computer program in a high level language to explore and solve a specific problem

Outline of Examination Syllabus

Students should have a working knowledge of the following areas:

1.   Programming topics

- Control structures
  - Sequence
  - Iteration
  - Choice
  - Nested structures

- Control statements
  - If-then-else
  - While or repeat-until
  - Switch (or case)

- Data types
  - Integer
  - Real (or Float)
  - Character
  - Boolean

- Data structures
  - Arrays (one and two dimensional)
  - Strings (or character arrays)

- Data operations
  - Variable assignment
  - Arithmetic expressions & operator precedence
  - Boolean expressions

- Input/output
  - Input operations: reading from keyboard or text files
  - Output formatting: to screen or writing to text files
  - Printable and non-printable characters

- Programming structures
  - Procedures
  - Functions
  - Value parameters
  - Built-in functions and library routines
- Algorithms and problem solving
  - See [past years sample examinations](#)

2. **Computer Science topics**

- Base conversion
  - Conversion of positive integers between bases binary, octal decimal.
- Binary numbers and arithmetic
  - Addition and multiplication of numbers in unsigned format. Subtraction using two's complement representation.
- Type representation
  - Students should know how characters might be represented using (for example) ASCII and Unicode.
  - Representation of signed integers and fixed point numbers in two's complement.
  - Floating point numbers using two's complement notation only (8-bit fractional two's complement for mantissa, signed integer for exponent).
  - Awareness of errors associated with accuracy and loss of precision—underflow, truncation, and overflow.
  - Normalization of floating point numbers is not required.
- Languages
  - Compilers and interpreters for high level languages.
- Computer architecture
  - Features of commonly used input, output and backing store devices.
  - Structure of a processor (ALU, CPU—internal details and registers not required).
  - Function of RAM, ROM, cache memory, and disk.
  - The following terms should be understood:
    - Virtual memory
    - Primary and secondary memory
    - Bit (b), byte (B), frequency (hz) and their modifiers (k, M, G, T)
    - Serial and direct access
    - Computer systems
  - Students should understand that an operating system is a collection of programs performing:
    - Communication with peripherals
    - Coordination of processes (including programs)
    - Memory management
    - File handling
    - Accounting
    - Security

- - - Data management
      - Error handling
    - o Students should understand the need for systems software to provide:
      - Utilities such as archiving (and compression), de-fragmentation, file maintenance
      - A user interface
- Data representation and graphics
    - o The relationship between numbers of colours and numbers of bits should be known; eg, 24 bits allows 224 or (approximately) 16 million colours.
    - o The relationship between resolution and file size should be understood
    - o Students should appreciate that different resolutions are appropriate for particular devices.
- Applications skills

Programming languages

The Department uses the C# language for first year programming courses. Candidates for the Scholarship are free to use any of the following languages:

- BASIC, including Visual Basic
- C, C++, C#
- Java
- Python
- JavaScript

For examination questions candidates will only be required to use text-based input and output.

Candidates who wish to program in other languages must seek written approval from the Department of Computer Science before applying for the Scholarship examination.

Resources

The textbook used in the first year Computer Science programming courses is:

- Tony Gaddis: *Starting Out with Visual C#,* Pearson, 2017

However, any instructional text on programming should be satisfactory.