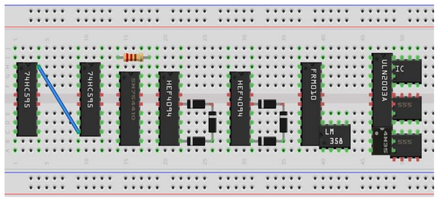
NIBBLE KNOWLEDGE

H. Anisingaraju, F. Bache, T. Brintnell, J. Gay, R. Harvey, N. Hiebert, Z. Li, Y. Lipkovich, G. Mohammed, B. Odegaard, V. Patel, C. Schmidt, M. Stanojevic, B. Tye, M. Waqar



Entrepreneurial Project

Team Number: L-5-En-324

THE 4 - BIT EDUCATIONAL COMPUTER KIT

Academic Advisors:
- Dr. Denis Onen
- Dr. Steve Norman

TA:
- Mark Li

WHAT IS IT ?

- A tool that allows teaching of computer skills at all levels
- Teaches everything from basic programming to the internal functionality of the CPU itself

OUR MOTIVATION

Computers are a ubiquity and a necessity in the modern world. However, in the Albertan secondary education system, dedicated computer classes are a relative rarity even though interest in computers is at an all-time high. Countries such as the UK and China have successfully pushed ahead with dedicated computer courses to give their students an educational advantage. We wanted to give Canada a chance to do the same.

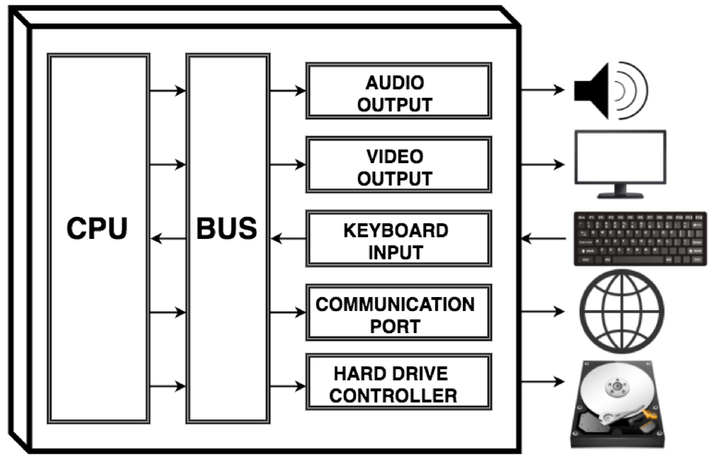
THE PRODUCT

Our team designed a 4-bit computer system kit for this purpose, along with an operating system and a compiler. The kit is made entirely from discrete logic components that can be connected to a breadboard. We also include complete documentation that explains how all the hardware and software works, building up from basic principles.

METHODOLOGY

Software

Open source software developed exclusively for this computer includes:
- Virtual Machine
- Custom BASIC language compiler
- Assembler
- Macro assembler
- Simple MS-DOS-like operating system



NIBBLE KNOWLEDGE KIT

Business

- Market assessment
- Market discovery
- Developing business model
- Developing value proposition
- Interacting with potential customers
- Pitching to investors
- Developing a solution that appeals to our target markets

Hardware

Computer built entirely on a breadboard from simple logic circuits, including:
- CPU
- Audio output
- Video output
- Keyboard input
- Serial port
- Hard drive controller

- **CPU:** The heart of a computer. A CPU follows a set of machine instructions that dictate its behaviour, whether it be arithmetic operations or decisions. The CPU also controls all of the peripherals through a common bus.
- **Audio:** The audio output creates an audible tone based on the value given to it by the CPU.
- **Video:** Controls a normal computer monitor, which allows the display of text on the screen.
- **Keyboard:** Signals are serially transmitted from PS/2 keyboard and are translated to a unique key code that is sent to the CPU.
- **Serial Port:** Allows the CPU to communicate bi-directionally to another computer or device. Signals are sent serially (bit by bit) across a serial cable.
- **Hard Drive Controller:** Controls a normal computer hard drive, which allows the storage and retrieval of files or programs.

ACHIEVEMENTS

- Successfully developed a working and simple educational computer kit
- Comprehensive documentation of all components of the computer from hardware to software tailored to a high-school level
- Team members demonstrated engineering design principles and project management skills to complete the project
- The kit performs as expected with all peripherals
- The hardware is successfully integrated with the software components
- Engaged with potential buyers and received positive interest and an early request to purchase

OUTCOMES

- Computer kit
- Comprehensive documentation on all components and circuit design
- Translatable programming language

CONTACT

Nibble Knowledge
Email: nibble.knowledge@gmail.com
Phone: (403) 862-7546
Other: (587) 716-5648

VALUE PROPOSITION

- Excellent computer literacy and architecture teaching tool
- Access to all levels of the hardware and software
- Comprehensive documentation
- Translatable programming language
- Unique novelty and openness to hobbyists
- Service, assembly, and troubleshooting for kits

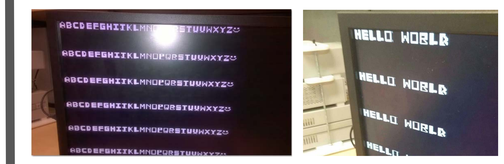
MARKET - Educational

- Introduce kit as a locally developed high school course
- Students outside of the conventional school environment
- Canadian First Nations School System

MARKET - Hobbyists

- Members of Protospace
- Openly available resources and documentation for hobbyists to innovate

SAMPLE RESULTS



Successful output!