

BlackBerry Operating System

By GradDip Students:
Liam Barrett – 0429848
Mary O’Riordan – 0243132

Topic Outline

- Introduction
 - History of BlackBerry OS
 - BlackBerry OS Architecture
 - Memory Management
 - Interrupts
 - Multi-Tasking
 - Future of BlackBerry
 - Conclusion
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Introduction to BlackBerry

- The BlackBerry is a Smartphone device released by Research In Motion (RIM) in 1999
 - Since it was released, its popularity soared due to following functions:
 - ability to send and receive internet e-mail using the “push” method of delivery
 - phone and texting functionality
 - supports Internet faxing and Web browsing
 - supports the viewing of Office applications
 - ability to support numerous other wireless information services
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Introduction to BlackBerry

- Bonus's of BlackBerry:
 - good choice of carrier
 - choice of devices
 - multitasking features
 - multimedia Messaging feature
 - e-mail and corporate integration
 - memory card slot
 - removable battery



Introduction to BlackBerry

- ❑ The BlackBerry Operating System is a software platform developed by its manufacturer RIM
 - ❑ Its OS provides multi-tasking that maximises use of the devices specialised platform including:
 - trackball, trackpad and touchscreen
 - ❑ Updated versions of the BlackBerry OS are released regularly to support new BlackBerry Smartphones
 - latest OS version is OS 5.0
 - ❑ The current version of the OS allows complete wireless activation and synchronization with Exchange's email, calendar and other features
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The History of BlackBerry

[Video History of the BlackBerry](#)



The History of BlackBerry

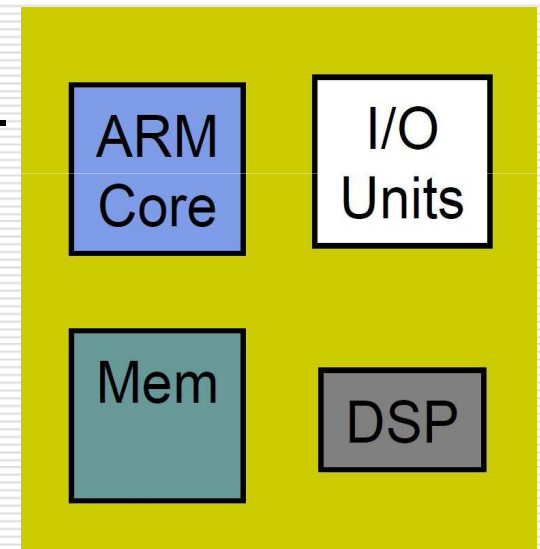
- ❑ Early versions of blackberry were simply two-way pagers, that were particularly popular in business for their focus on e-mail facilities, as well as providing wireless internet and calendar functions
 - ❑ With the release of the 5000 and 6000 series, BlackBerry made the switch to mobile phones and introduced a Java-based kernel
 - ❑ The 7000 series followed, and were the first to feature colour screens and Bluetooth capability
 - ❑ The 8000 and the 9000 series were the first to be targeted at general consumers, incorporating more commercial features, such as built-in cameras, memory card slots and clearer screens
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BlackBerry OS Architecture

- ❑ For the purposes of this presentation, we have chosen the BlackBerry 9000 series, which runs v5.0 of the BlackBerry OS
 - ❑ This version of the BlackBerry OS has a Java based kernel, and utilizes an ARM architecture with an Intel XScale processor
 - ❑ ARM is a Reduced Instruction Set Computer (RISC) type instruction set architecture
 - ❑ It uses 16 x 32-bit registers, 1 processor status register and a load/store architecture
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BlackBerry OS Architecture

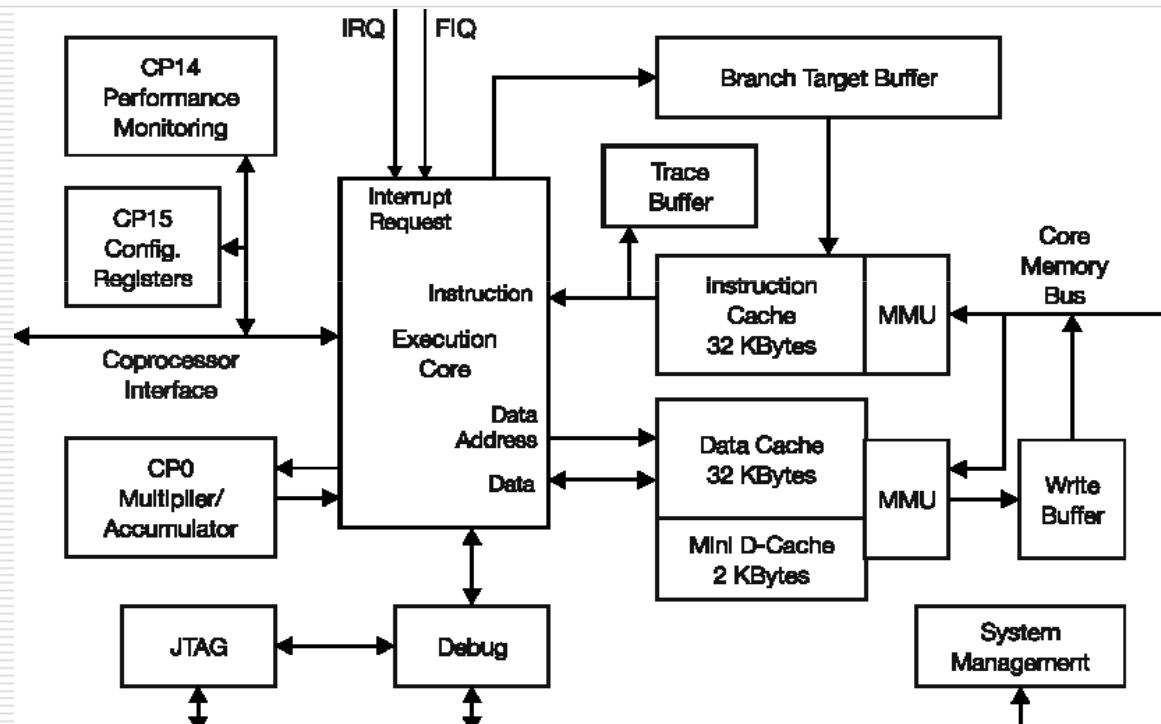
- ❑ ARM does not manufacture its own CPU chips, but licenses it to other manufacturers to integrate them into their own system
- ❑ The latest series of BlackBerry phones (the 9000 series) uses a XScale micro-processor core
- ❑ This processor utilizes an open source bootstrap firmware called RedBoot (Red Hat Embedded Debug and Bootstrap), designed for embedded systems



ARM Core

BlackBerry OS Architecture

□ The ARM v5TE Instruction Set



Memory Management

- Memory is divided into three sections:
 - Application Memory (~128MB)
 - a dedicated memory space for application storage and overhead
 - Device Memory (~850MB)
 - for storing files and other media
 - Memory Card (optional)
 - an optional method of file storage
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Memory Management

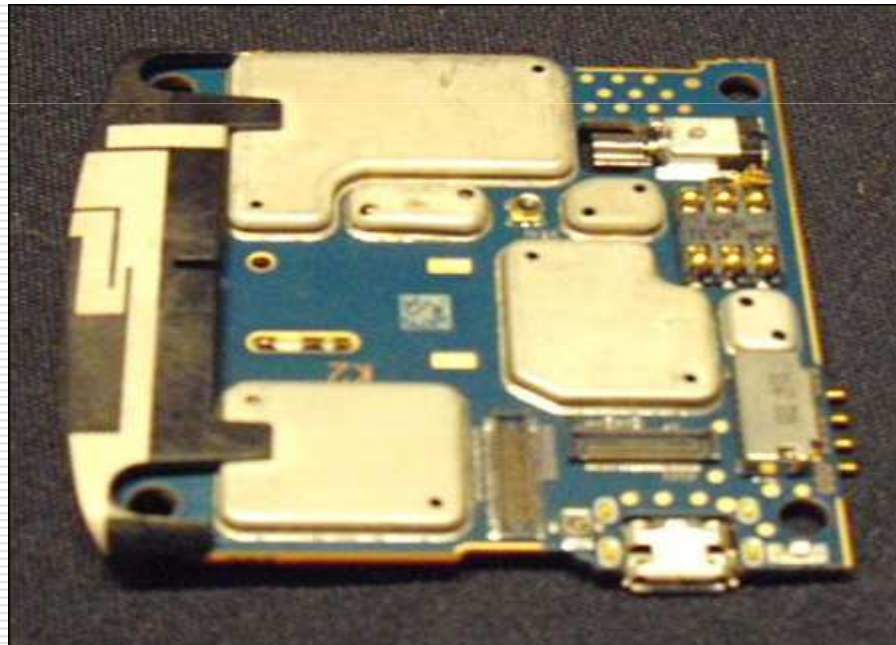
- A common criticism of the BlackBerry is that Device Memory cannot be allocated to supplement Application Memory
 - this is especially inconvenient as Application Memory handles all the overhead for running apps. If the device also has memory card storage, this makes the Device Memory redundant
 - Also, the memory manager does not release memory after applications are closed, which can lead to a considerable slowdown of the device over time or prolonged use
 - this is a major drawback for a device that is primarily marketed at those in business
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Interrupts

- A feature of the ARM architecture is to allow designers to make the decision between performance vs. latency tradeoffs
 - For example:
 - instructions that would normally run to completion can be made interruptible where low latency is a priority
 - This is particularly useful in the case of mobile phones or other telecommunication devices, which run on embedded systems that require low latency to perform adequately
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Sample CPU board

- ❑ Blackberry Storm: CPU board
 - Contains a Qualcomm chipset with a 528 Mhz processor and both EV-DO and HSDPA modems



Multi-Tasking

- ❑ The BlackBerry supports multitasking
 - ❑ It can thus run more than one application at a time
 - ❑ For example:
 - while making a call, you can switch to the calendar or contacts application
 - ❑ These applications run in the background while carrying out current task
 - ❑ However, the more applications that are running, the more memory used by device
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Future of Blackberry

- ❑ The future of blackberry is looking very upbeat.
 - ❑ RIM has plans to release new improved models in the coming year with the following features:
 - Improvement of browser with full Flash and Microsoft Silverlight support
 - Upgrading of speed with LTE devices that can achieve speeds of up to 10 Mbps
 - Upgrading of operating system to OS 6.0 in next few months
 - ❑ The new OS will feature kinetic scrolling and should further enhance its popularity in industry
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Conclusion

- ❑ The blackberry OS is the software platform within the device
 - ❑ Each new OS version, in turn leads to better browsing facilities and larger memory
 - ❑ The blackberry is on par with the iPhone as a smartphone leader
 - ❑ It may even surpass it due to it's multitasking features and ability to support wireless devices!
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