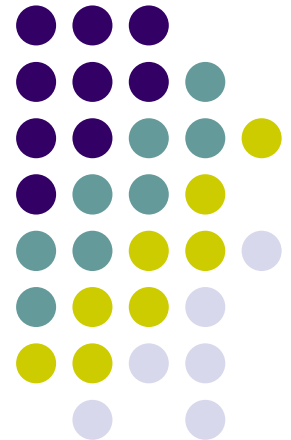


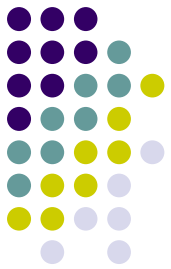
Game Platforms for Mobile Devices



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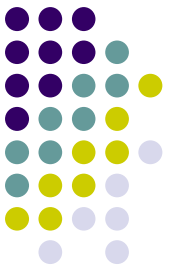


New mobile services require
new mobile software platforms

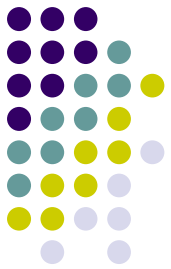


New mobile services require new mobile software platforms

- **Problem #1 - Mobile real-time interactive graphics**
 - Slow (GDI, Java)
 - Difficult (Direct access)
 - Hot topic (Siggraph 2002 panel - "Unsolved Problems in Mobile Computer Graphics and Interaction")
- **Problem #2 - Mobile ad hoc network applications**
 - GPRS/UMTS did not deliver (>2s latency, low bandwidth etc)
 - Connecting devices ad hoc is now easy (using ZeroConf etc)
 - Creating ad hoc network apps is difficult (auto multicast, guaranteed UDP, congestion control, service discovery, ...)
 - Hot topic (CHI-, UbiComp-, and CSCW-workshops)



New mobile software platforms
may lead to new mobile services

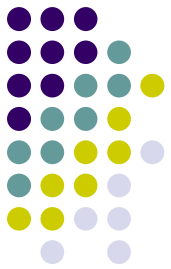


The plan

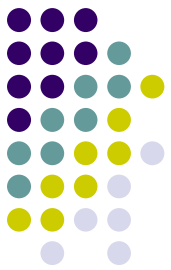
- In early 2000 I began to work on two software platforms:
 - One platform for real-time graphics
 - One platform for ad hoc network applications
- Estimated development time: 2 years part time
- Goal: To enable the creation of interactive and real time ad hoc networked services on mobile devices.



One of many popular Nokia games



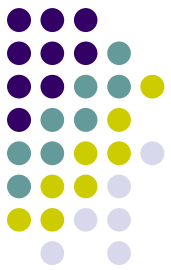
Graphics platform 2002 : GapiDraw



Graphics platform: GapiDraw

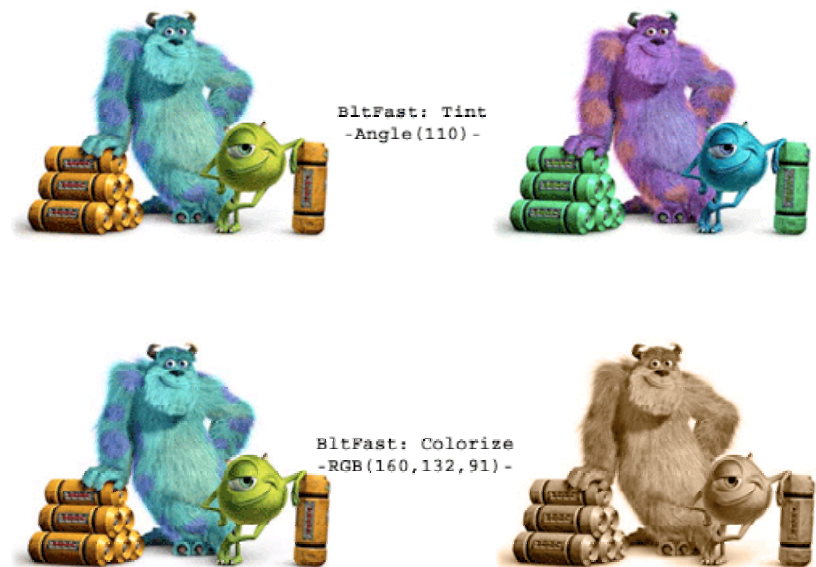
- Graphics library for Stationary PCs, Pocket PCs and Smartphones (OSX, Linux soon)
 - Low level layer: hardware accelerated and DirectDraw compatible
 - High level layer: one student created an advanced Tetris clone in less than three hours (with real time zoom and animated blocks).
- DirectDraw superset - existing commercial games can be ported to handhelds in a few hours
- Supports hardware acceleration when available (applications can run in accelerated windowed or full screen mode on Stationary PCs)
- Really optimized (meta-programming, surfaces are stored in native display orientation, ASM analysis)





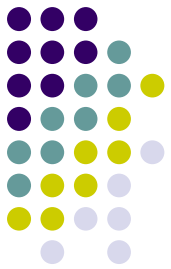
GapiDraw: Some features

- Supports most image formats (png, jpg, gif, etc)
- Bitmapped fonts (with kerning & tracking)
- Real-time rotation and zoom
- Real-time alpha blends
- Real-time color tints and colorizations
- First release: March 2002
- Current user base July 2002: More than 100 active developers, ~30 commercial games in 3 months

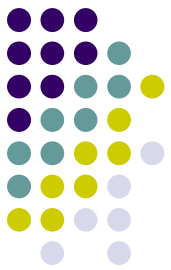


GapiDraw: Some games...





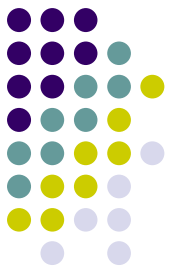
Ad hoc network platform 2002 : OpenTrek



Network platform: OpenTrek

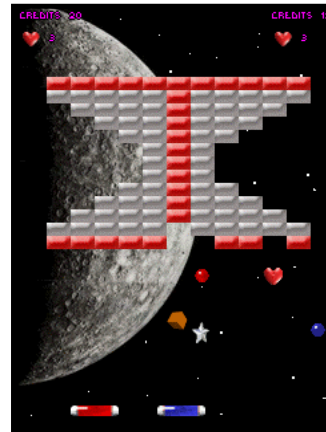
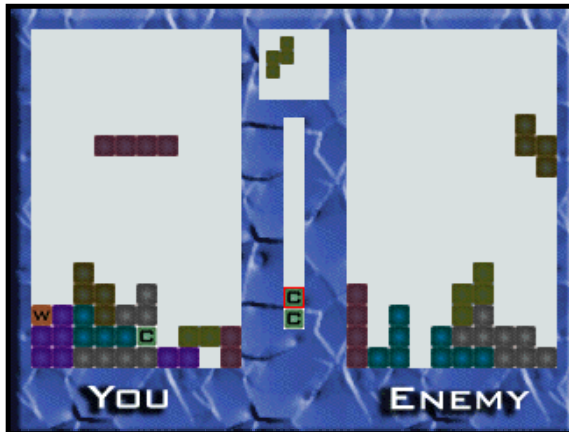
- Designed to be used on Zero Configuration systems
- Works on Stationary PCs and Pocket PCs (Smartphone, OSX and Linux support is in development)
- **Supports ad hoc networks:**
 - “Communicate with people within my proximity”
 - Uses a custom-built network module with the exact same feature set as DirectPlay (auto multicast, reliable UDP, message fragmentation, congestion control, timeouts)
- **Supports client/server networks:**
 - “Communicate with people in the current chat room”
 - Uses DirectPlay for communication
- **Supports IR networks:**
 - “Communicate with the person next to me”
 - Uses a custom-built IR module

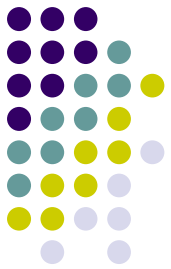




OpenTrek: In use

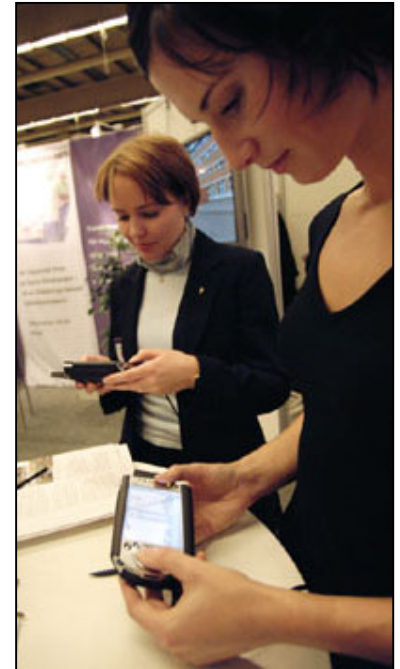
- 30 students created 12 advanced multiplayer games for handheld devices in less than 4 weeks
- All games used GapiDraw & OpenTrek platforms
- Shared game boards





Other uses

- GapiDraw & OpenTrek are today used in several industrial applications, including:
 - Medical Applications
 - Robot Control Systems
 - Flight Management Systems
 - ...
- And of course many research labs...





To summarize

- **GapiDraw** - mobile graphics platform
 - Free, downloadable from www.gapidraw.com
- **OpenTrek** - mobile ad hoc network platform
 - Free, downloadable from www.opentrek.com
- What you need:
 - Some (minor) knowledge of C++ or Java
 - A development tool (VC++ or the free EVC++)
- -> Live Demo <-

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