Qweak Track Recognition

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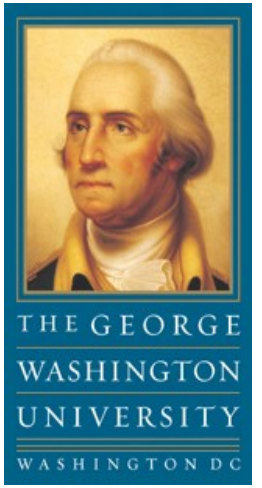

Tri-weekly Tracking Meeting
1 November 2006

Overview

- How track recognition works
- Code overview
- Motivation for using pattern recognition
- Phase 1 Status – Track Recognition Package
- Outlook

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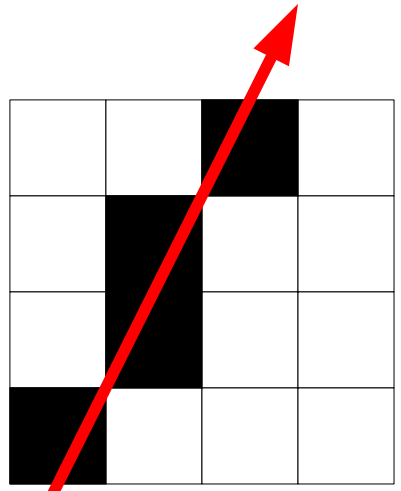
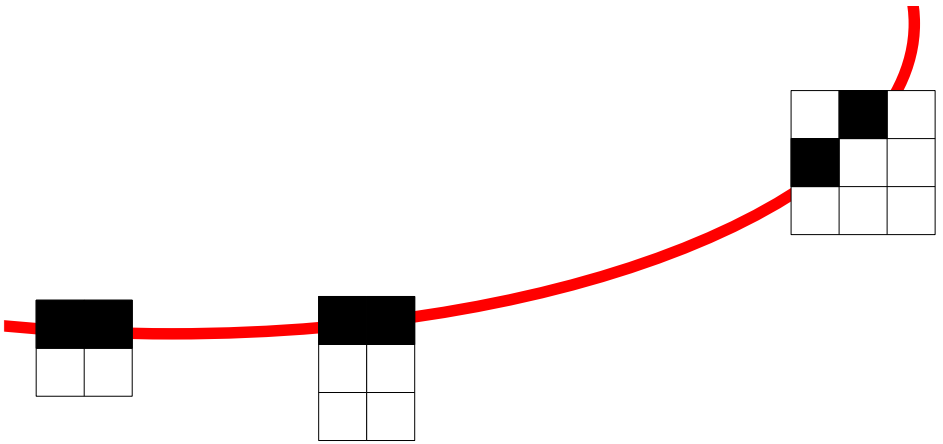
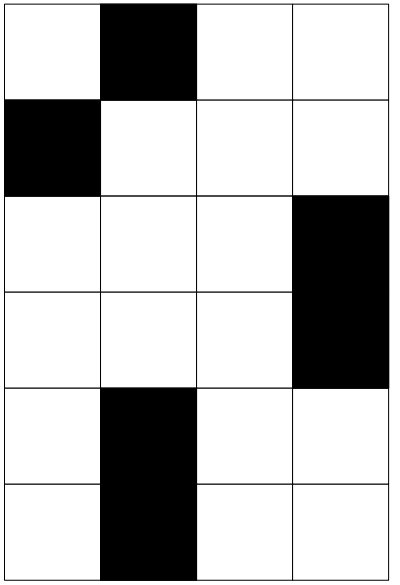
Pattern Representation of Tracks



Track Segment



Complete Track



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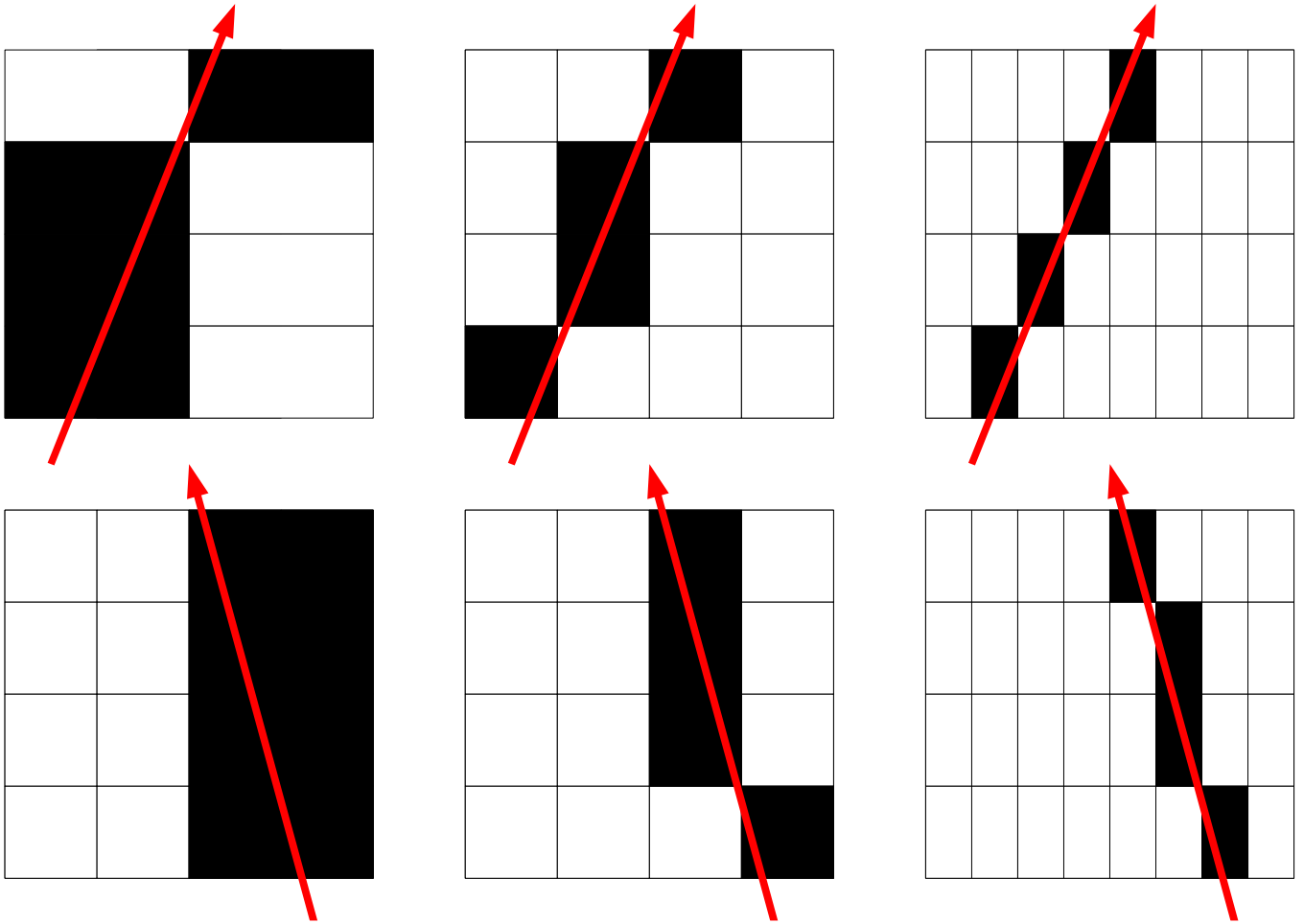
Variable Pattern Resolution



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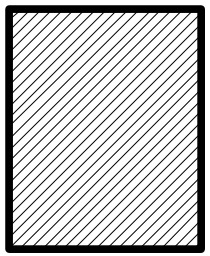
Track Recognition Code



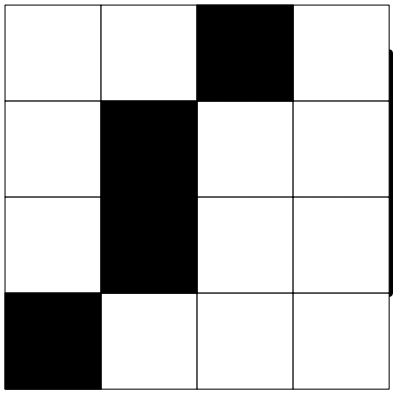
Cell
(a hit)

Cells (may) contain :

- row/column position
- TDCs
- links to calibration info
- links to position info
- etc...

Cell.h
Cell.cc

Track Recognition Code



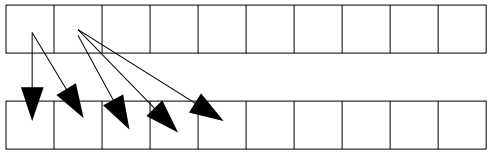
Pattern
(a track or event)

Patterns (may) contain :

- Array of cells => patterns are abstract matrices
- parent/child pattern pointers
- Track parameters
- Left/Right ambiguities

pattern.h
pattern.cc

Track Recognition Code



TarrayPattern and PatGen

PatGen is used to manage :

- Arrays for large numbers of patterns
- Pattern Generation
- User-Defined “isPhysical” functions
- Saving/Loading Pattern Sets

TArrayPattern.h
TarrayPattern.cc
patGen.h
patGen.cc

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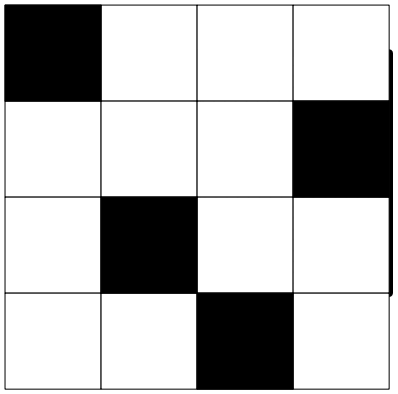
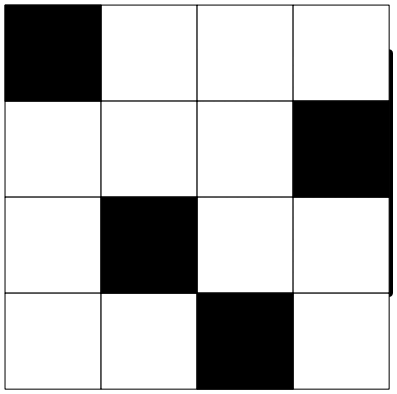
Why use track patterns?



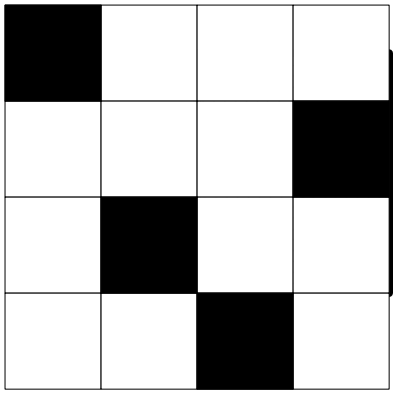
- To quickly recognize tracks and reject background
- To store track parameters for fast track fitting
- Excellent for implementation of acceptance studies
- Complicated tracking/calibration techniques are easier to implement
    - Multiple track recognition/fitting
    - Missing hit track reconstruction

Phase I Status – Track Recognition



- PatGen is near completion as a general pattern manager
- Testing continues for the various components
- Documentation will be posted soon and the package will be deposited into the new Subversion repository

Outlook



- Phase II : Develop track fitting package on top of PatGen
- Phase III : A main program will be tailor-made to apply the tracking packages to the Qweak detectors
- Phase IV : Dress up the tracking software to include various tracking techniques, acceptance studies, and calibration methods