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********** JADE COMPUTER NOTE NR. 28

M. GODDARD J.OLSSON VERSION FROM 12.10.79 ***********

GENERAL ABOUT PATTERN RECOGNITION:

PATTERN RECOGNITION PROCEEDS IN SEVERAL SEPARATE STEPS, NAMELY

- CELL PATTERN RECOGNITION. TRACK ELEMENTS, I.E. PIECES OF TRACKS ARE FOUND IN THE 96 CELLS. VARIOUS INFORMATION FOR THE TRACK ELEMENTS IS STORED IN COMMON /CWORK/
- BACKTRACING. TRACK ELEMENTS ARE CONNECTED TO FORM WHOLE TRACKS, USING THE INFORMATION IN (CWORK). THE TRACKS NOW EXERST IN FORM OF CROSS REFERENCE ARRAYS IN (CWORK), TELLING WHICH TRACK ELEMENTS BELONG TO WHICH TRACKS AND WITH WHICH POLARITY (LEFT OR RIGHT OF THE WIRE PLANE) 2/
- TRACK FITTING AND FETCHING OF REMAINING POINTS WHICH ORIGINALLY WERE NOT ASSIGNED TO TRACK ELEMENTS. THE PROGRAMS HANDLING THESE OPERATIONS HAVE A CERTAIN CAPACITY TO JUDGE AND CORRECT THE SEGULTS FROM POINTS 1/ AND 2/. THUS A TRACK ELEMENT MAY BE TRACK ELEMENT MAY THEN BE PICKED UP BY ANOTHER TRACK FIT. THIS TRACK ELEMENT MAY THEN BE PICKED UP BY ANOTHER TRACK OR FORM A TRACK BY ITSELF. IN SHORT, A CERTAIN EDITING OF CELL PATREC AND BACKTRACING TAKES PLACE. 3/
- FINAL RESULTS ARE STORED IN THE HITLABEL ARRAY (BANK 'JHTL') AND THE TRACK BANK 'PATR'. 4/

GENERAL ABOUT EDITING: ************** ALTHOUGH AUTOMATIC EDITING TAKES PLACE IN POINT 3/ ABOVE, ADDITIONAL MANUAL EDITING IS OFTEN REQUIRED. FOR THIS PURPOSE AN INVERACTIVE GRAPHICS EDITING PROGRAM HAS BEEN DEVELOPED TO ALLOW THE SCANNER TO ASSIST PATTERN RECOGNITION. THIS PROGRAM PRTERS BETWERN POINTS 2/AND 3/ABOVE AND HAS THE TASK TO EDIT THE OUTPUT OF THE BACKTRACING PROGRAM, I.E. THE ASSIGNMENT OF TRACK ELEMENTS TO TRACKS, IN SUCH A WAY THAT FITTING AND POINT FETCHING ARRIVES AT A CORRECT END RESULT. THUS THE SCANNER MAY REASSIGN TRACK ELEMENTS TO OTHER TRACKS OR

TO COMPLETELY NEW TRACKS; HE MAY REVERSE THE LEFT/RIGHT AMBIGUITY SOLUTION FOR TRACK ELEMENTS OR WHOLE TRACKS; HE MAY DELETE TRACK ELEMENTS OR WHOLE TRACKS AND HE MAY COMBINE SEVERAL TRACKS INTO ONE. THE SCANNER HAS THE POSSIBILITY AT EACH STAGE OF HIS EDITING TO MAKE A TEST CALL TO THE FIT AND FETCH PROGRAMS, TO SEE HOW THE FINAL RESULT WOLLD LOOK, BASED ON THE CURRENT SITUATION OF TRACK ELEMENT /

EDITING IN PRACTICE:

THE EDITING PROGRAM IS ACTIVATED BY THE GRAPHICS COMMAND 'EDIT'.

STEPS 1/ AND 2/ OF THE NORMAL PATTERN RECORNITION ARE THEN PERFORMED

AND THE EDIT PROGRAM IS ENTERED. THE SCANNER HAS NOW A NUMBER OF

GRAPHICS SUBCOMMANDS TO ALD THE EDITING. THESE SUBCOMMANDS ARE CALLED

UP BY NUMBER CODES TO AVOID CONFUSION WITH REGULAR GRAPHICS COMMANDS;

TO SIMPLIFY THE EDITING WORK, MANY OF THE SUBCOMMANDS AND ABREADING ONE ON TWO THAT SUBCOMMANDS;

VIATED BY ENTERING ONE OR TWO TRAILING NUMBERS (INTEGERS), CORRESPONDING TO THE NUMBERS THAT OTHERWISE WOULD BE PROMPTED FOR. THE NUMBERS

MAY BE SEPARATED BY BLANKS OR COMMAS.

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DISPLAYED IN ADDITION, IF THE NUMBER 100 IS ADDED TO THE SUBCOMMAND. THUS THE SUBCOMMANDS 6 AND 106 WILL DISPLAY THE RAW EVENT WITHOUT AND WITH THE DETECTOR IMPOSED. ANY SUBCOMMAND INVOLVING AN EVENT DISPLAY MAY HAVE THE DETECTOR

THE SUBCOMMANDS ARE DESCRIBED BELOW:

(EQUIVALENT: JUST ENTER) LEAVE THE PROGRAM, SEE BELOW 0 CODE

DISPLAY FULL LIST OF ALL AVAILABLE COMMANDS CODE 1:

MAKE A HARDCOPY OF CURRENT PICTURE 2 CODE

MAGNIFICATION. THIS CORRESPONDS TO THE GRAPHICS COMMAND JOYS. TO MAGNIFY AN AREA, ENTER OPPOSITE CORNERS OF THE AREA WITH JOYSTICK INPUT (CONTROL + E). ٠. ٣ CODE

RESET THE MAGNIFICATION FROM 3. 4: CODE COMMENT OPTION. THE SCANNER CAN ENTER A PERSONAL COMMENT TO THE PICTURE (IF HE HAS A JOYSTICK !). 5 CODE

DISPLAY THE RAW EVENT (ALL HITS, WITH MIRRORS). 9 CODE

CHANGE THE VIEW. UPON ENTERING THE EDITING PROGRAM, THE RA VIEW (LARGEST INNER DETECTOR VIEW) IS DEFAULT. BY CODE ANY OTHER VIEW CAN BE CHOSEN. 7: CODE

(TRAILING NUMBER OPTIONAL) ^^^----- CALL THE GENERAL GRAPHICS DISPLAY/COMMAND PROCESSOR. THIS SUBCOMMAND SHOULD BE USED AS LITTLE AS POSSIBLE AS IT MAY 00 CODE

LEAD TO UNEXPECTED OVERWRITING OF COMMON / CWORK/. MOST OF THE GENERAL GRAPHICS COMMANDS, LIKE OFFL, LIK OF TR. AVAILABLE INSTITE DITTING PROGRAM (SEE BELOW).

THE COMMAND YET', PROVIDED THAT ONLY COMMANDS OF PURELY GRAPHICAL CHARACTER HAS BEEN GIVEN. IF NOT, E.G. IF A COMMAND LIKE "EDIT" IS GIVEN, THE SCANNER IS RETURNED TO THE OFFLER. MAIN COMMAND PROCESSOR; PREVIOUS EDITING RESULTS ARE LOST PRINT THE BACKTRACE RESULT ARRAYS. THIS IS USEFUL IN COMP-LICATED EVENTS WHERE IT MAY BE UNCLEAR WHICH ELEMENTS BELONG TO WHICH TRACK. 9 CODE

IF INFORMATION IS DESIRED ONLY FOR ONE OF MANY TRACKS, THE TRACK NUMBER MAY BE ENTERED AS A TRAILING NUMBER. EXAMPLE: TO KNOW WHICH ELEMENTS BELONG TO TRACK 5, (OR 9,5) ^^^

ENTER

INTEREST TO THE AUTHOR(S) OF CELL PATTERN RECOGNITION. VARIOUS DISPLAY OPTIONS FOR CELL PATTERN RECOGNITION. THESE COMMANDS ARE LESS USEFUL FOR EDITING BUT ARE OF CODE 10-15:

DDES 16 - 19 BELOW AR DISPLAY OPTIONS FOR HITS BELONGING TO TRACK ELEMENTS (AND THEREPORE ALSO WITH TRACKS). THESE CODES DO NOT DISPLAY ADDITIONAL HITS PICKED UP BY THE FIT AND FETCH PROGRAM (PATROL). FOR SUCH DISPLAYS, GO TO CODE 26 AND ITS SUBOPTIONS.

THIS IS ALSO TRUE FOR CODE 27 WHICH HAS ITS CORRESPONDENCE IN CODE 26 WITH SUBOPTION 5. CODES 16

BE FOLLOWED BY A PROMPTING FOR A TRACK NUMBER. GIVEN A VALID TRACK NUMBER, THE HITS OF THIS TRACK ARE DISPLAYED AND A NEW TRACK NUMBER IS PROMPTED FOR. THE SEQUENCE IS FINISHED BY ENTERING A NON-EXISTING TRACK NUMBER (E.G. 0 OR RETURN) AND THE REMAINING PART OF THE EVENT IS DISPLAYED. FOR CODES 16,18,19 AND 27, A SEQUENTIAL DISPLAY MODE HAS BEEN INSTALLED. THUS ENTERING OF THE CODE WILL

DISPLAY ALL HITS ASSOCIATED WITH TRACKS. THE TRACK NUMBERS ARE ALSO WRITTEN AT THE EMPODINTS OF THE TRACKS, AS WELL AS THE TRACK ELEMENT NUMBERS AT THEIR RESPECTIVE ENDPOINTS THIS VIEW (OR VIEW 19) IS THE MAIN REFERENCE VIEW AND CODE 16:

7 1997 15:10:01	LEFT / RI DELETE TR OBS!!! A DEL REASSIGNING ASSIGN THE T THEN AUTOMAT THEN AUTOMAT	EDITING OPER (TRAILING NU	26:	27:	EXIMA HIIS F OBS: SEE ALSO THE CHANGE LIMIT GRAPHICS COM	29:	BANKS. THUS CONTINUE EDI THROUGH ALL FOR THIS VAL	30:	31: SHOW	APPEARS DETECTOR SETTING	322	33: DELE: THIS TO G	THIS COMMAND TO BE WRITTE	WRITTEN BACK GIVING THIS SETTLED WHEI A NEW SAVE A PRESENTLY ON FILE, WHICH
Aug 7			CODE	CODE	CODE	CODE		CODE	100 100 100		CODE	CODE		
Page 3	RTI USE LL		ED RED				AY	2.	TED	HE S		SE IG		BUT
15:10:01 jbjcn28.text.txt	SHOULD BE DISPLAYED OFTEN IN THE EDITING PROCESS, IN PARTICULAR AFTER DELETION OR JOINING OF TRACKS. THIS IS BECAUSE DELETION OF E.G. TARCK 10 WILL CAUSE A RENUMBERING OF ALL TRACKS 11,12 ETC. ADDITIONAL EDITING WITHOUT CONSULTING THE VIEW OF CODE 16 OR 19 WILL WITH HIGH PROBABILITY LEAD TO A MESS.	DISPLAY ALL HITS NOT ASSOCIATED WITH TRACKS.	DISPLAY ALL HITS ASSOCIATED WITH TRACKS, MAKING SELECTED TRACKS WITH SPECIAL SYMBOLS (SLASHES/CROSSES). THE DESIRED TRACK NUMBERS ARE ASKED FOR. (TRAILING NUMBER OPTIONAL)	DISPLAY ALL HITS IN THE EVENT, MARKING TRACK ELEMENT ASSOCIATED HITS WITH SPECIAL SYMBOLS.	CHANGE DISPLAY DETAILS. CORRESPONDS TO GRAPHICS COMMAND CDTL USEFUL ARE OPTIONS 9,17,19,20,28 (SEE GRAPHICS MANUAL) ENTERING CODE 20 DISPLAYS A LIST OF ALL AVAILABLE OPTIONS. (TRAILING NUMBER OPTIONAL)	WRITE THE CONTENT OF THE "MIDOUT" PART OF COMMON/CWORK/THIS CODE IS ONLY FOR EXPERTS.	MAKE A TEST CALL TO THE FIT AND FETCH PROGRAM AND DISPLAY THE RESULTS ON TOP OF THE CURRENT VIEW. THE RESULTS ARE DISPLAYED IN THE SAME WAY AS IN GRAPHICS COMMAND 'RES',	I.E. A LIST OF TRACK PARAMETERS AND DISPLAY OF FITS. THE DISPLAY OF TRACK PARAMETERS AND DISPLAY OF FITS. SUPRESSED IN THE EDIT PROGRAM. IT CAN BE REVOKED BY ANY TRAILING NUMBER FOLLOWING THE CODE 22. SETTING DISPLAY DETAIL 13 (BY CODE 20) REVERSES THIS OPTION. THUS THE PARAMETER LIST ALMAYS APPEARS AND EN SUPRESSED BY ENTERING A TRAILING NUMBER AFTER CODE 22	SAME AS 22, BUT NOW FOR SELECTED TRACKS, WHICH ARE PROMPTED FOR. IF ONLY ONE TRACK IS DESIRED, IT CAN BE ENTERED AS A TRAILING NUMBER.	TRACK EDITING: THIS AND THE FOLLOWING CODE ARE THE ACTUAL EDITING COMMANDS. THE EDIT PROGRAM PROMPTS	THE CANNER TO GIVE IN THE OLD AND THE NEW IFACK NOMBER EXAMPLES: TO JOIN TRACKS 7 AND 5 ENTER 7 5 (OR 7,5) TO JOIN TRACKS 7 AND 5, THEREBY REVERSING LEFT/RIGHT AMBIGUITY FOR TRACK 1 ENTER 7 -5 (OR 7,-5) TO CHANGE INTERNAL NUMBERING OF TRACK 10 TO CHANGE LEFT/RIGHT AMBIGUITY FOR TRACK 8 ENTER 10 NN (NN > NTR)	US IN JOINING NUMBER MUST E BY REINSTALLIN (SEE BELOW) TRACK EDITUNG		TRACK ELEMENT EDITING: THIS COMMAND IS SIMILAR TO 24, I DEALS WITH TRACK ELEMENTS. THE EDIT PROGRAM NOW PROMPTS FOR TRACK ELEMENT NUMBER AND NEW TRACK NUMBER. SOME EXAMPLES: ASSIGN TRACK ELEMENT 48 TO TRACK 5 ENTER 48 5 ASSIGN TRACK ELEMENT 48 TO TRACK 5 AND REVERSE ITS
Aug 7 1997 15:10:01			CODE 18:	CODE 19:	CODE 20:	CODE 21:	CODE 22:	OBS:	CODE 23:	CODE 24:			^	CODE 25:

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OF THE GRAPHICS SESSION. THIS IS THE COMMAND TO BE GIVEN WHEN ON THE SCREEN APPEARS THE TEXT: **** BITTE LOG OFF ****
IT IS ALSO WISE TO EXERCISE THIS COMMAND REGULARLY TO PRO-OBS:

TECT ONESELF AGAINST IBM BREAKDOWNS, WHICH (AS EXPERIENCE SHOWS) TEND TO HAPPEN TOWARDS THE END OF COMPLICATED EVENT EDITING.

(THANK LAWRENCE H. O'NEILL FOR THIS VALUABLE OPTION)

BEING AUTOMATICALLY CORRECTED. IMMEDIATELY AFTER EUTRY INTO EDIT THE FIT AND HIT SERACH ROUTINES HAVE NOT YET BEEN ENTRED AND THE TRACK ELEMENTS AND TRACKS ARE EXACTLY AS THEY COME OUT OF BACKTRACE. ENTERING ANY CODE WHICH CALLS THE FITTING AND HIT SERACH ROUTINES (E.G. 22,26) CAUSES THE ASSOCIATION BETWEEN TRACK ELEMENTS AND TRACKS TO CHANGE AND SOME TRACKS MAY DISSAPPEAR IF THEY BECAME REDUNDANY AS A RESULT OF FITTING AND TRACK EXTRADOLATION. SINCE THIS IS AN ITERATIVE PROCESS. SEVERAL ENTRIES INTO TRACK FITTING MAY SOMETIMES BE REQUIRED TO REACH CONVERGENCE. "AUTOMATIC EDITING" INVOKED. A VERY POWERFUL OPTION. THIS CAUSES THE INPUT TO THE FITTING AND HIT SEARCH ROUTINES TO BE UPDATED DEPENDING ON THE RESULTS OF THE PREVIOUS FIT. THIS RESULTS IN SOME PATERN RECOGNITION ERRORS THUS IN USING THIS CODE THE USER SHOULD ENTER CODE 22 (OR CODE 26) SEVERAL TIMES BEFORE LOOKING CODE 35:

CK ELEMENTS (CODES 16,18,ETC.). TO MALCOLM GODDARD ONLY. AT THE TRACKS AND TRACK ELEMENTS COMPLAINTS / COMMENTS OBS OBS:

DISPLAY HITS BELONGING TO TRACKS BY THE CORRESPONDING TRACK NUMBER. THIS OPTION IS USEFUL IN ENLARGED VIEWS OF COMPLICATED AREAS, WHERE THE ACTUAL TRACK NUMBER IS NOT VISIBLE. THIS OPTION IS SWITCHED OFF BY ENTERING CODE 36 ONCE AGAIN. IT IS ONLY EFFECTIVE IN CODES 16 - 19, BUT WILL LATER BE IMPLEMENTED ALSO IN THE VIEWS OF CODE 26. CODE 36:

SIMILAR TO CODE 36 BUT INSTEAD DISPLAYING HITS BY THEIR TRACK ELEMENT NUMBER. CODE 37:

LEAVING THE EDIT PROGRAM:

WHEN EDITING IS COMPLETED, ENTER 0 OR SIMPLY RETURN.

TO AVOID THE INVOLUNTARY LEAVING OF THE EDIT PROGRAM BY THE ACCIDENTAL PUSHING OF THE BETONER HIS INTENTION TO LEAVE BY ANSWERING YES BEFORE HE IS ALLOWED TO LEAVE. BEFORE LEAVING THE PROGRAM, THE SCANNER HAS TO SETTLE A SMALL DIALOGUE: THE SCANNER IS ASKED WHETHER HE WANTS TO KEEP HIS EDITED RESULTS. IF ANSWER IS NO. THE TEMPORARILY CREATED BANKS ARE DELETED AND RETURN MADE TO THE MAIN COMMAND PROCESSOR.

THE INTENTION TO DESTROY THE EDITING WORK HAS TO BE CONFIRMED BY ANSWERING YES, BEFORE PROCEEDING.

IN CASE OF SAVING RESULT, THE EDITOR IS ASKED FOR HIS DIVING YOR YEAR OF THE EDITIOR OF THE EVENT, OKAY OR

IF ANSWER IS YES: RETURN TO MAIN COMMAND PROCESSOR.
IF ANSWER IS NO: THE SCANNER IS ASKED TO SPECIFY WHICH
TRACKS HE CONSIDERS STILL TO BE WRONG. NOT OKAY.

THE BANK 'PATR' AND ALSO TO THE MARKING OF THE EVENT AS A WHOLE.

SEVERAL DURING THE EDITING, A LABEL FOR EACH TRACK IS SET ACCORDING TO THE ACTION TAKEN AND ACCORDING TO A GIVEN BIT PATTERN. WOREOVER, SEVERAL OTHER BITS IN THIS LABEL ARE SET IN OTHER STAGES OF THE PATTERN RECOGNITION, DEPENDING ON VARIOUS CONDITIONS. A DESCRIPTION OF THIS LABEL WILL BE ISSUED SEPARATELY.

A COPY OF THIS INFORMATION CAN BE OBTAINED BY SUBMITTING THE JOB JBJCN28 ON THE LIBRARY JADEPR.TEXT