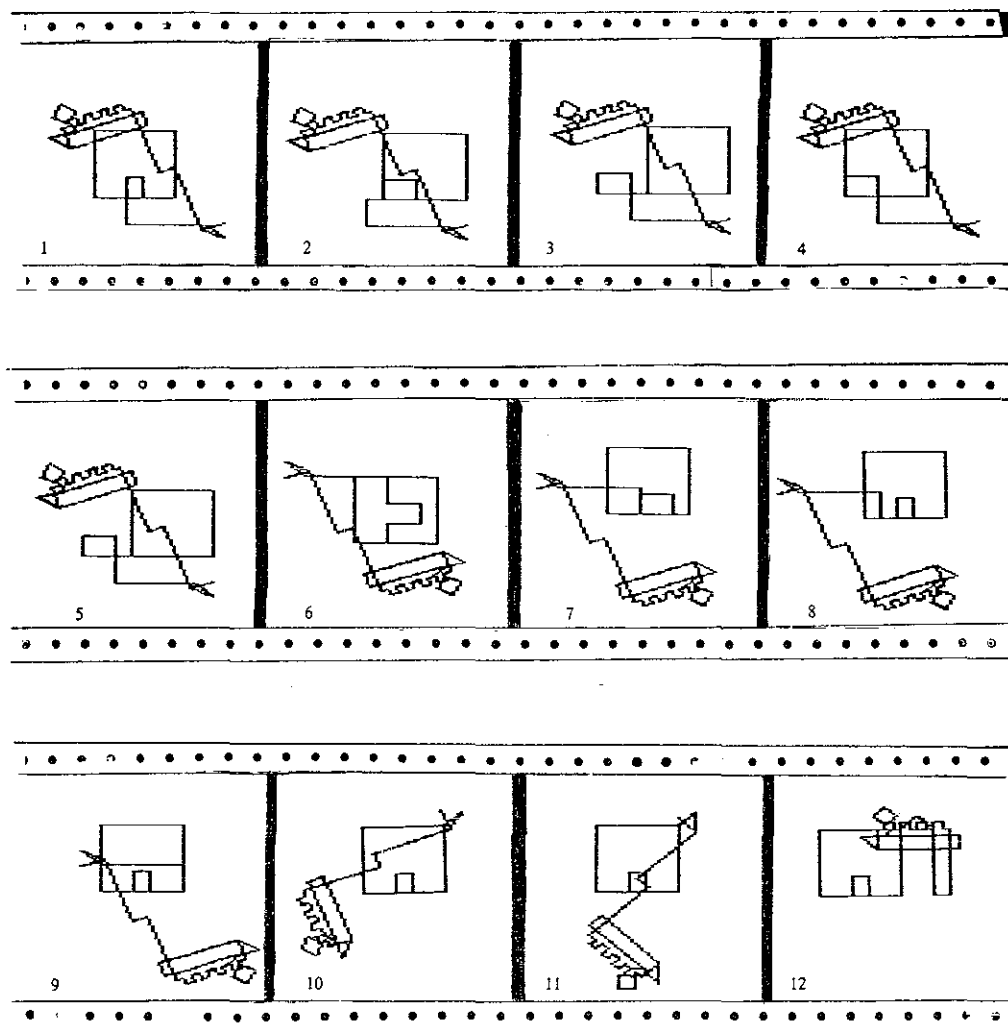
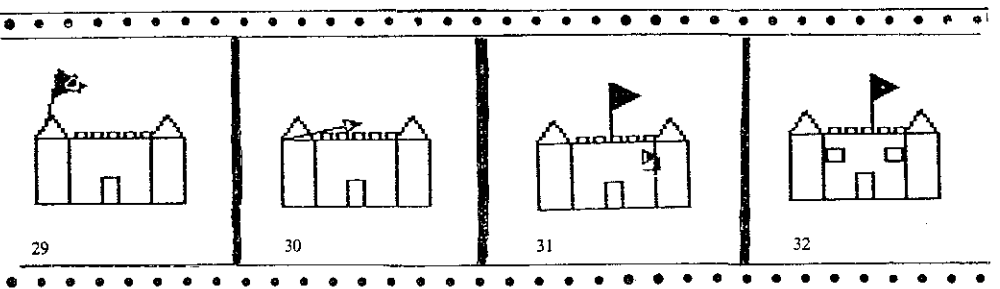
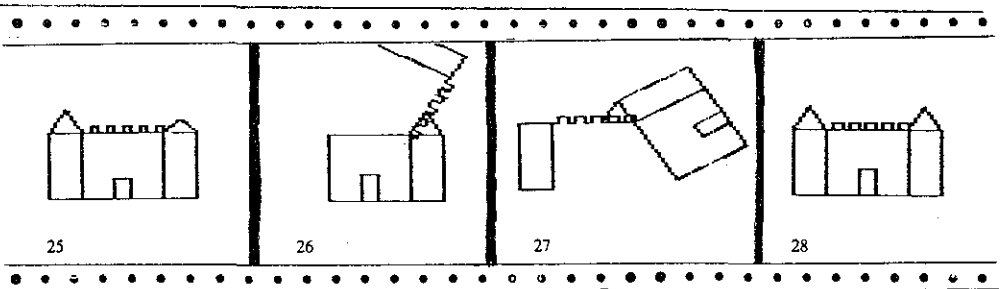
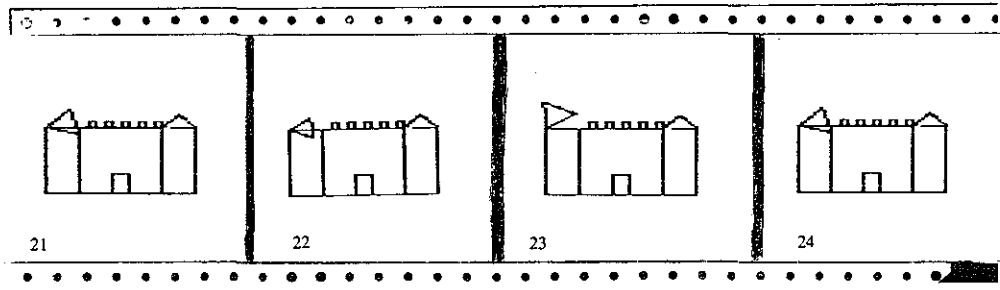
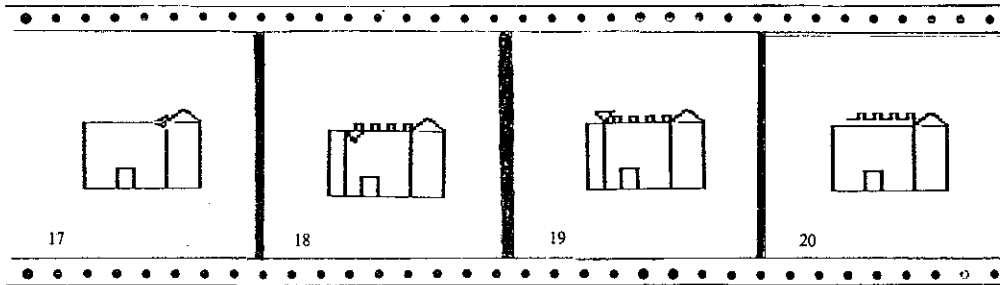
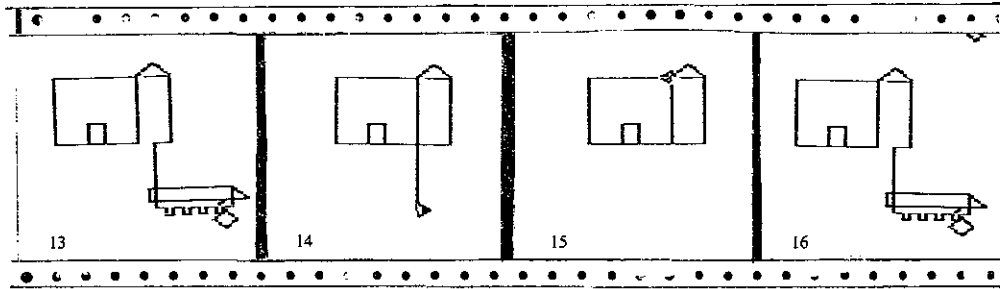


“Un château en Espagne”

JOEL HILLEL*

*With special thanks to Alain Senteni for his help with the observations of the children.





The above 32 frames are taken from 56 different productions corresponding to an initial LOGO program TO CASTLE and its subsequent modifications. They are presented in their proper temporal order. CASTLE was the final project chosen by a pair of 12 year olds with 55 hours of Turtle Geometry experience. It took nearly 3 hours to complete.

The initial program was written at home and then entered directly in the LOGO Editor prior to its execution (Frame 1). Frames 2-13 show the result of some of the debugging attempts which were made directly in the Editor after each running of the program. From that point onwards, debugging included some direct-mode activity where part of the construction was done in a step-by-step fashion prior to making modifications in the overall program.


It is interesting to note that these children, despite their substantial experience of using subprocedures, do not attempt a modular program. This is *their* project and success is important, so the best strategy is to "play it safe." A spaghetti-style program still represents, for these children, the mode in which they feel they have most control.

The tops of the right and left towers were both initially

planned using 45° and 90° angles. But direct-mode work led the children to call another procedure, for the first time, in order to construct the top of the left tower (Frame 21). They called their procedure for a triangle (actually, they used POLY 3 :L, a special case of their general POLY :N :L procedure). Frames 21-24 point to their difficulties in placing the triangle correctly, rather reminiscent of their difficulties the previous year in putting a triangular roof on a house (see [1]). Having finally succeeded (Frame 25), they chose to symmetrize their construction by using the triangle procedure to construct the right hand tower top. This resulted in the "Great Collapse" (Frames 26-27) as they tried several inappropriate interfaces with the subprocedure. The whole sequence from Frame 21 to Frame 27 actually supports the children's contention that it is simpler to avoid subprocedures. When they finally recovered from the collapse, they proceeded with great caution on the way to their final goal.

I chose the title for its double meaning in French, one sense of which is of an (almost) impossible dream.

[1] J. Hillel, On LOGO Squares, Triangles and Houses. *FLM* 5. 2 (1985)



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REPEAT 4 [FD 50, RT 90]
LT 90 BK 20 50 RT 90 90 FD 15 RT 90 FD 15
RT 90 90 FD 15 RT 90 FD 20 RT 90 LT 90
FD 50 RT 45 90 FD 15 RT 135 90 FD 15 RT 135 FD 15
BK 15 LT 90 FD 50 LT 90 FD 10 RT 90 FD 50
LT 90 FD 50 RT 90 FD 5 RT 90 REPEAT 3 [FD 5 RT 90]
RT 90 FD 5 RT 90 REPEAT 3 [FD 5 RT 90]
RT 180 FD 5 RT 90 RT 90 Repeat 3 [FD 5 LT 90] RT 180 FD 5 RT 90
Repeat [FD 5 LT 90] RT 180 FD 5 FD 15 RT 90
BK 50 RT 90 FD 10 LT 90 FD 50 RT 90 LT 90 FD 10
RT 135 FD 15 RT 135 FD 15 RT 135 RT 135
RT 135 RT 135 RT 180 FD 5 RT 135 LT 90 PU
FD 5 RT 135 Repeat 4 [FD 10 RT 90] PU FD 35 RT 90 FD 60
LT 90 FD 35 PD Repeat 4 [FD 10 RT 90]

```

THE
END