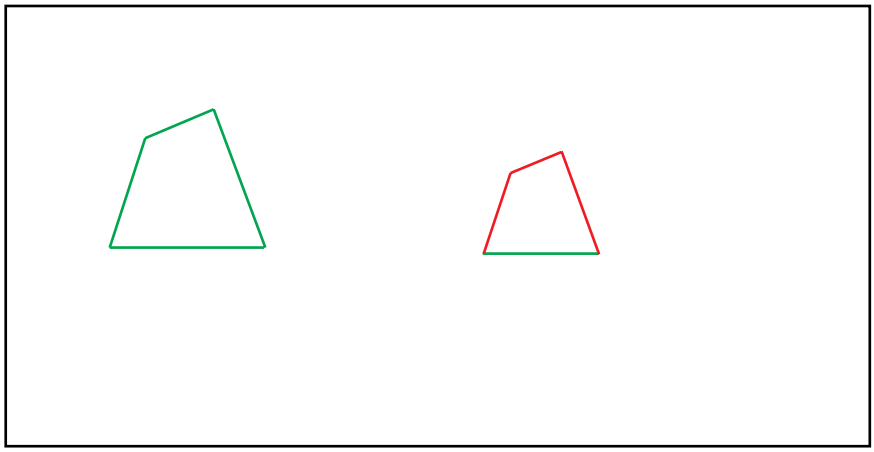
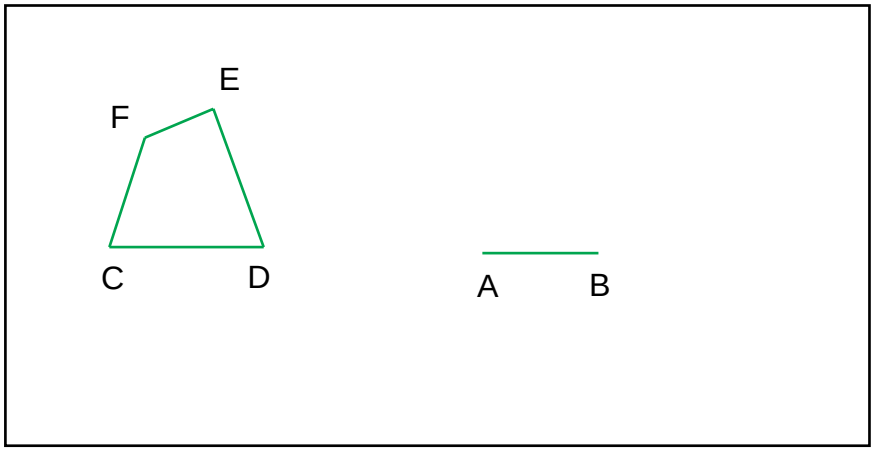
Construction 44: Book VI, Proposition 18

On a given straight line to describe a rectilineal figure similar and similarly situated to a given rectilineal figure.

VI.18:3. Let AB be the given straight line and CE the given rectilineal figure;

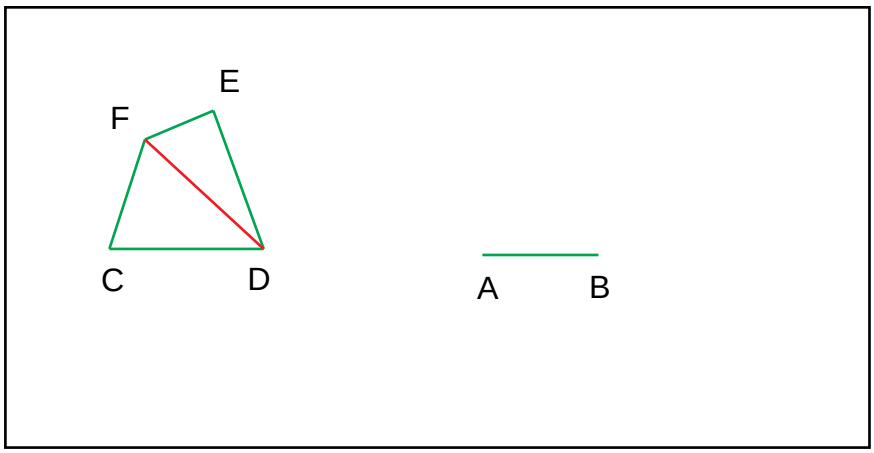


VI.18:8. Let DF be joined,



VI.18:8. and on the straight line AB, and at the points A, B on it, let the angle GAB be constructed equal to the angle at C, ([I.23])

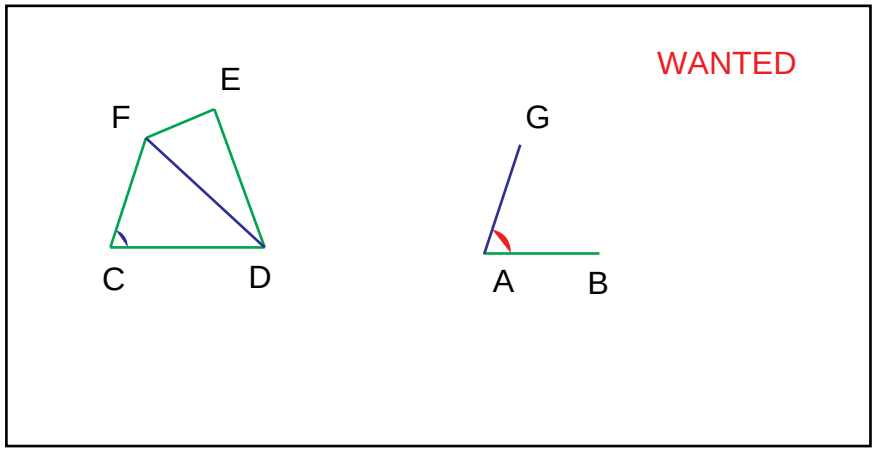
GOSUB I.23, C#9



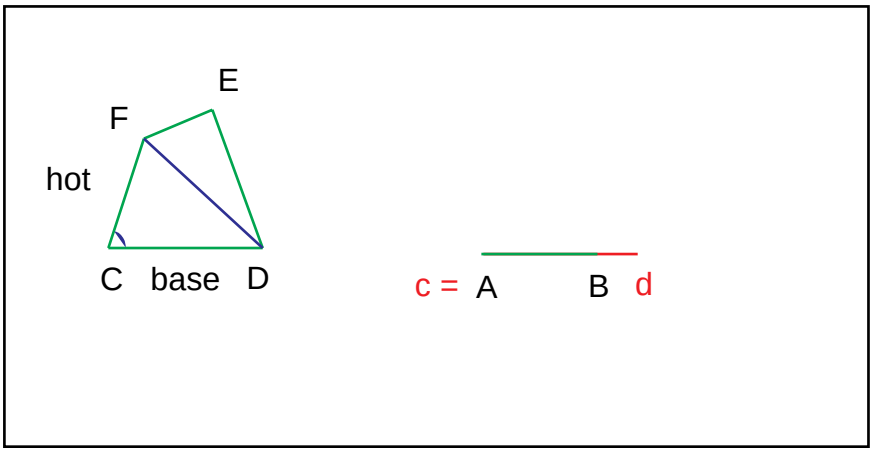
(As the angle at C is the angle FCD of a triangle FCD, we may go directly to C#8P, The Proclus variation of I.22, to move the triangle so that the base CD moves to AB, with the hot end C moving to A.

GOSUB I.22 (C#8P)

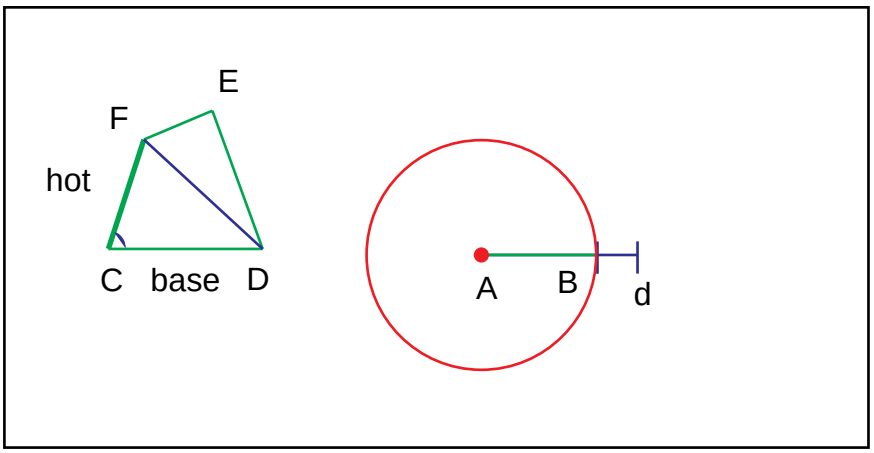
Move the base CD onto the line AB. Let cd be the moved base, with c at A.



Swing the hot arm (the distance CF) around the hot end of the moved base, A, as centre.

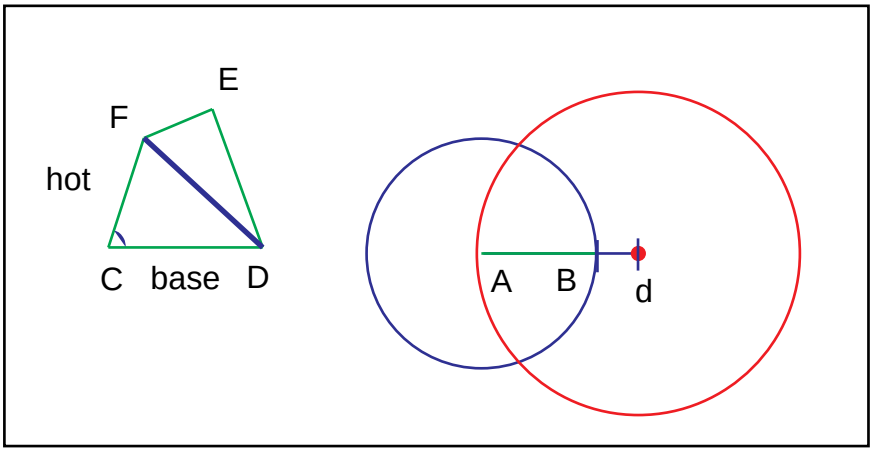


Swing the cold arm FD around the cold end, d, of the moved base.



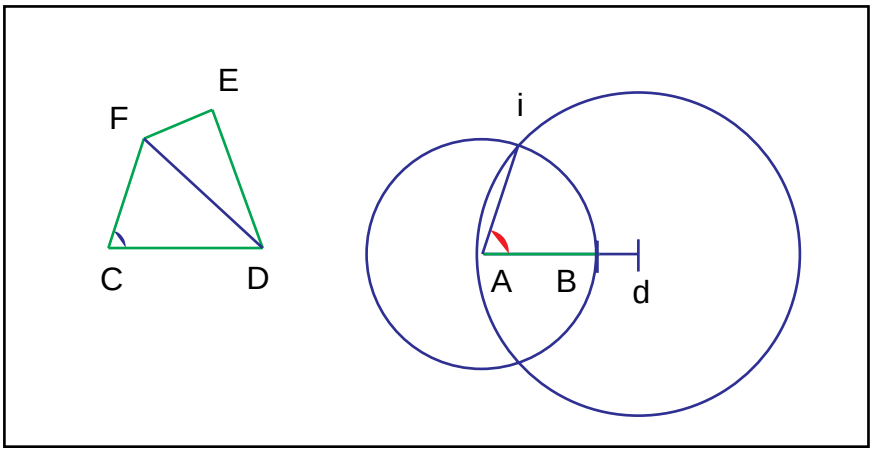
Connect the upper crossing point i to the hot end A.

Cleanup.
RETURN to VI.18:8.

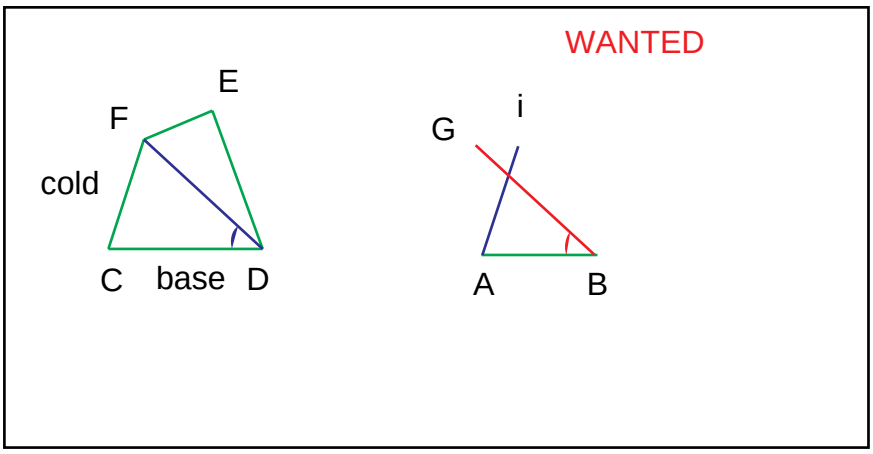


VI.18:10. and the angle ABG equal to the angle CDF. [I.23]

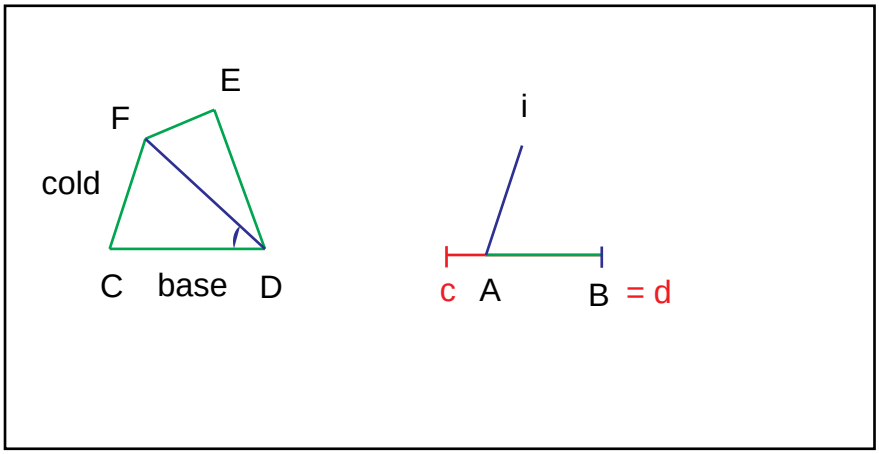
GOSUB I.22 (C#8P).



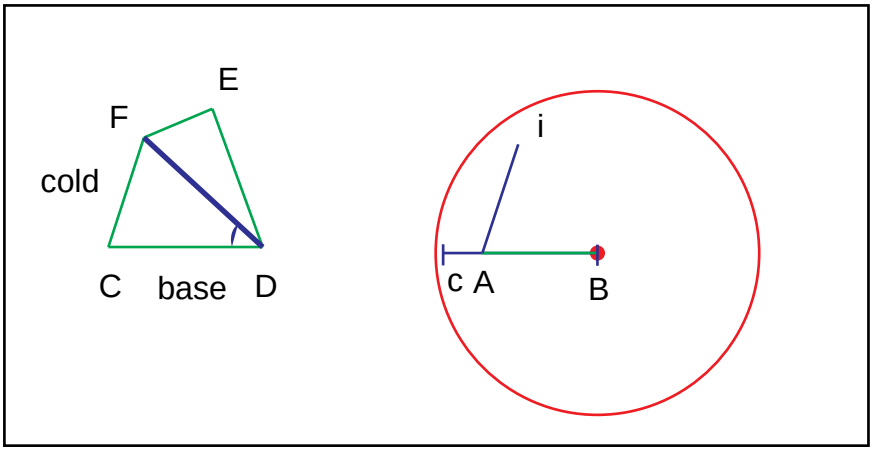
Move the base CD onto the line AB.
Let cd be the moved base, with d at B.



Swing the hot arm FD around the hot end B of the moved base cB.

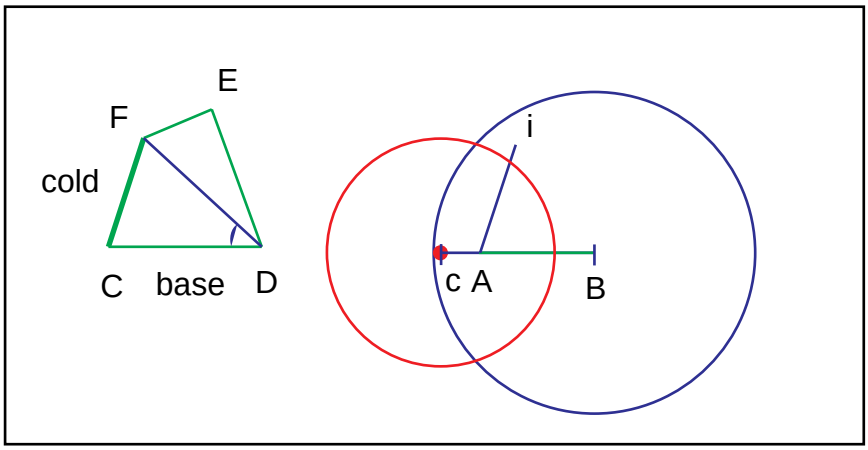


Swing the cold arm CF around the cold end c of the moved base cB.

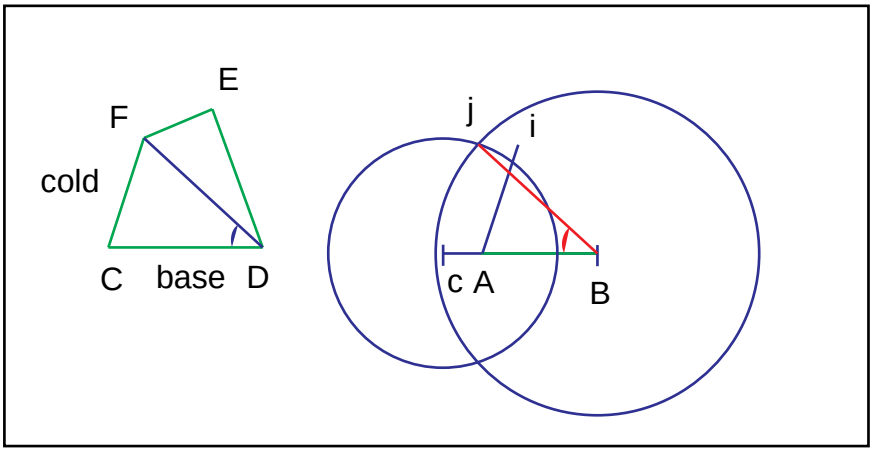


Connect the upper crossing point j to the hot end B.

Let G denote the point where Ai meets Bj.
Cleanup.
RETURN to VI.18:10.

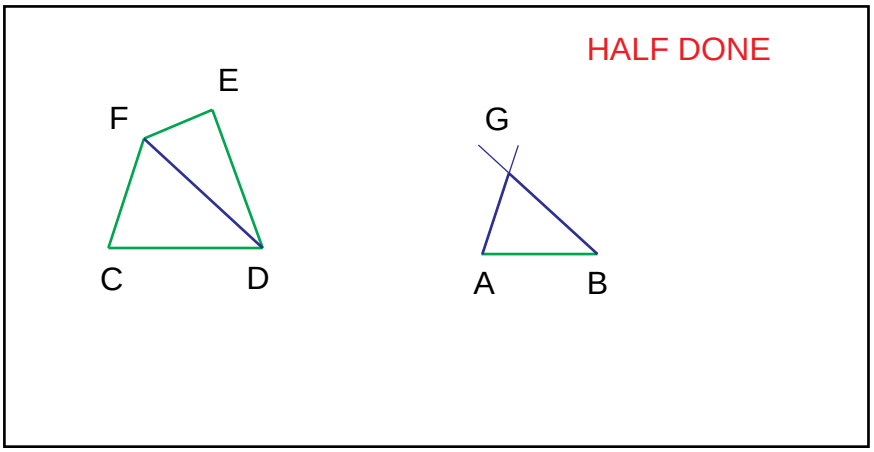


VI.18:14. - Therefore the triangle FCD is equiangular with the triangle GAB.

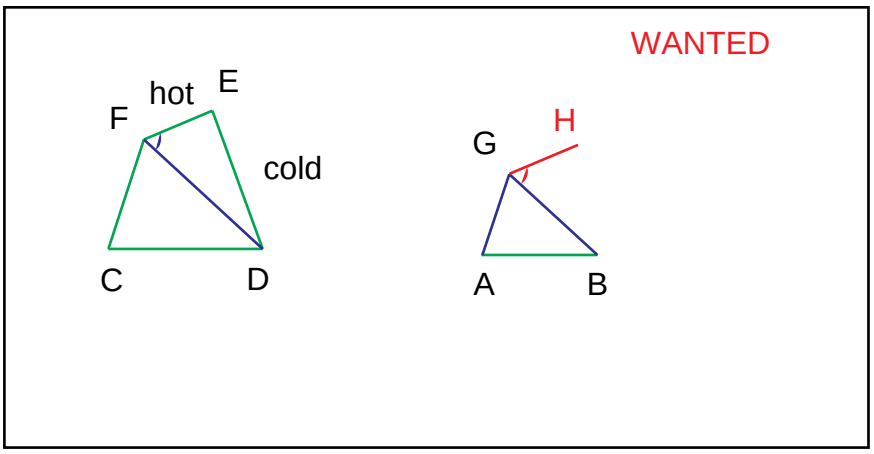


VI.18:18. - Again, on the straight line BG, and at the points B, G on it, let the angle BGH be constructed equal to the angle DFE, ([I.23])

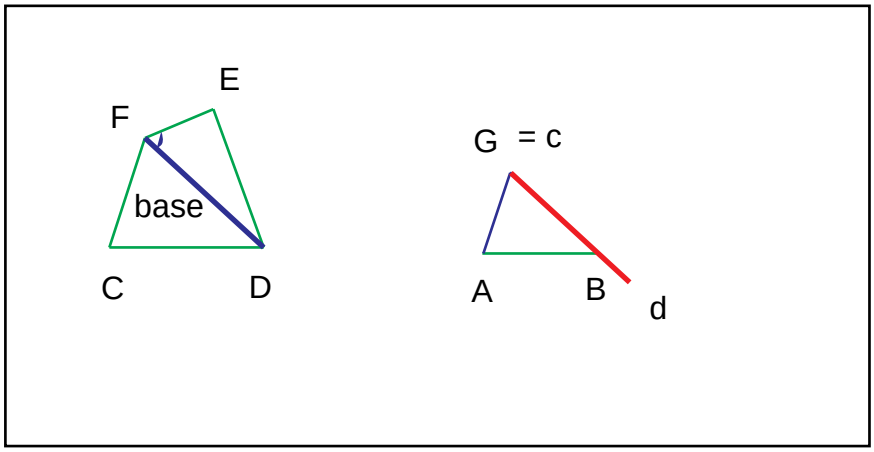
GOSUB I.22 (C#8P)



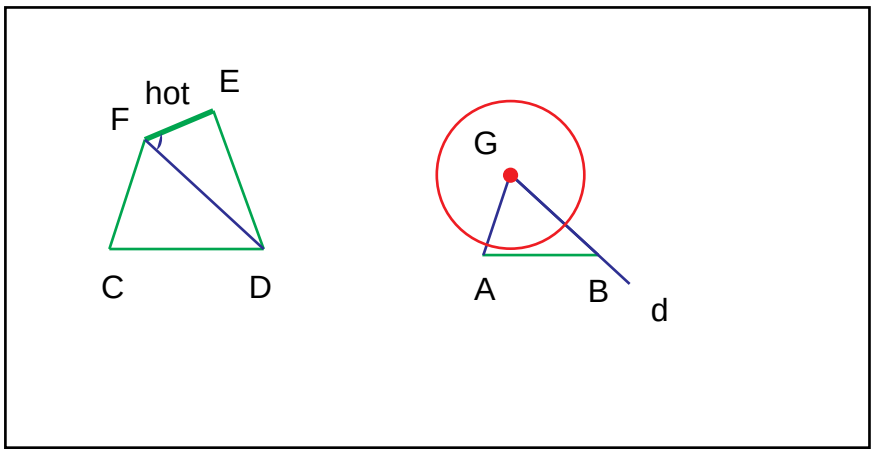
Move the base FD onto the line GB. Let cd be the moved base, with c at G.



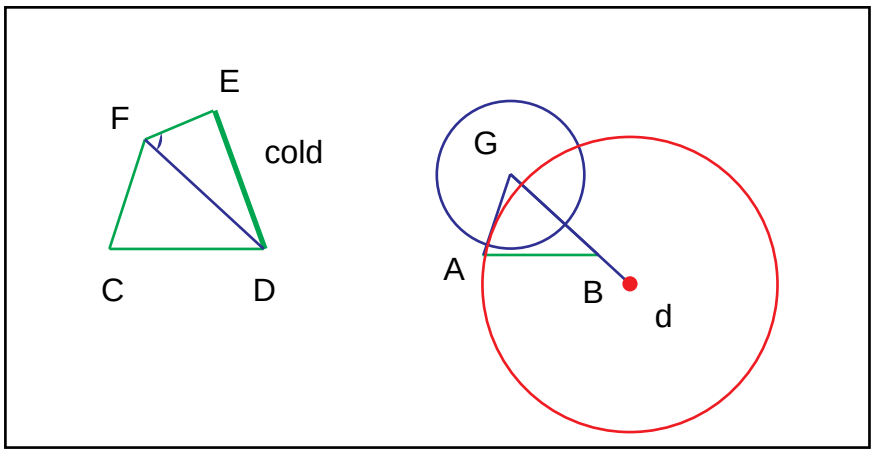
Swing the hot arm FE around the hot end G of the moved base Gd.



Swing the cold arm DE around the cold end d of the moved base Gd.



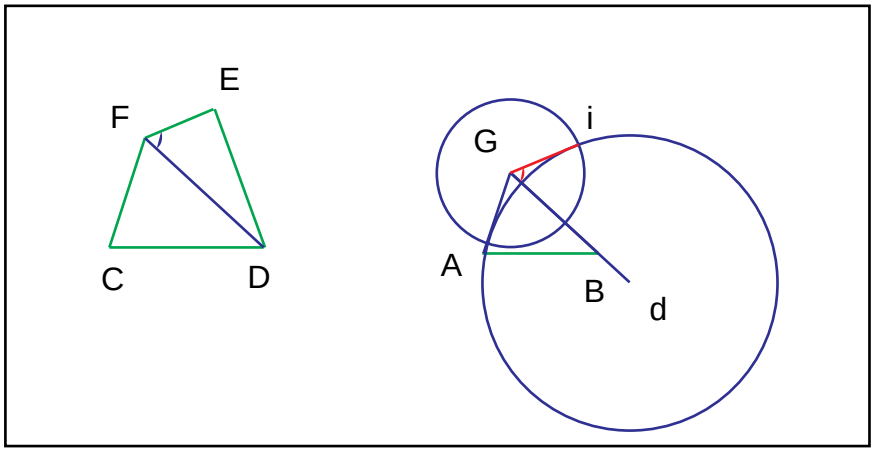
Connect the upper crossing poiut i to the hot end G.



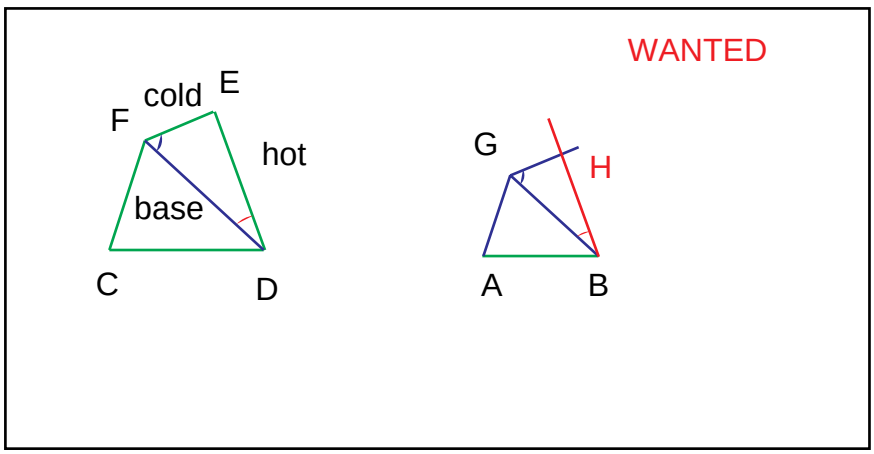
Cleanup.
RETURN to VI.18:18.

VI.18:20. and the angle GBH equal to the angle FDE. [I.23]

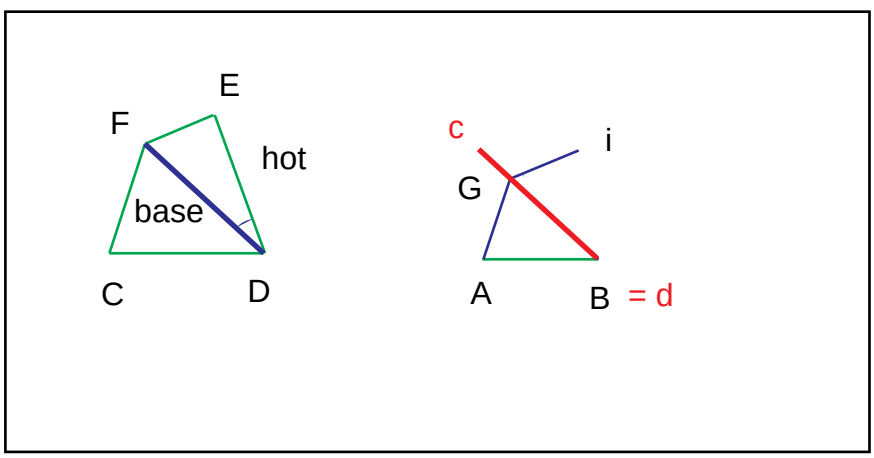
GOSUB I.22 (C#8P)



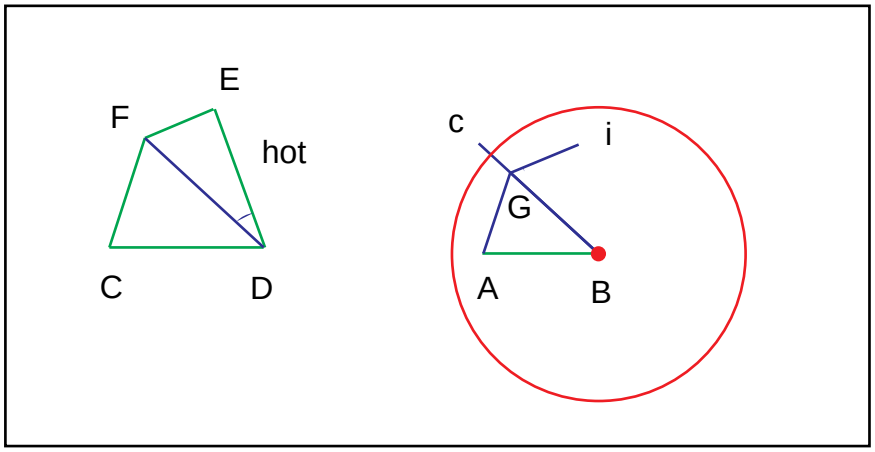
Move the base FD to the line GB. Let cd be the moved base, with d at B.



Swing the hot arm ED around the hot end B of the moved base Bc. (See step 12.)

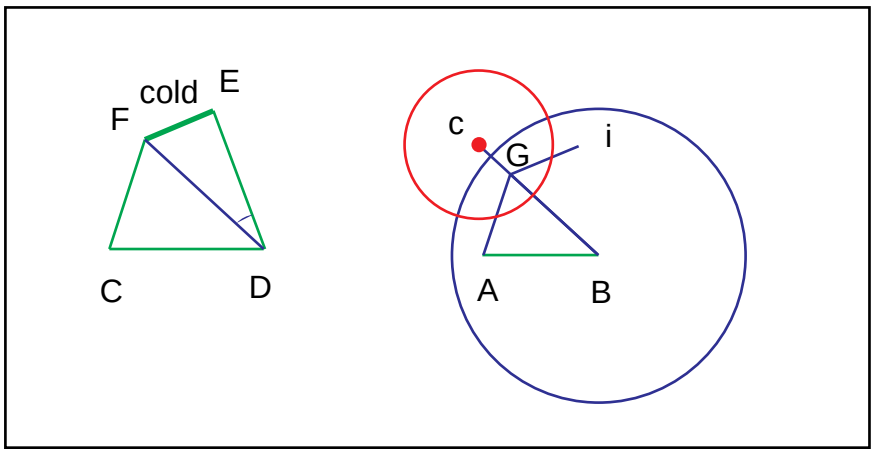


Swing the cold arm FE around the cold end c of the moved base cB.

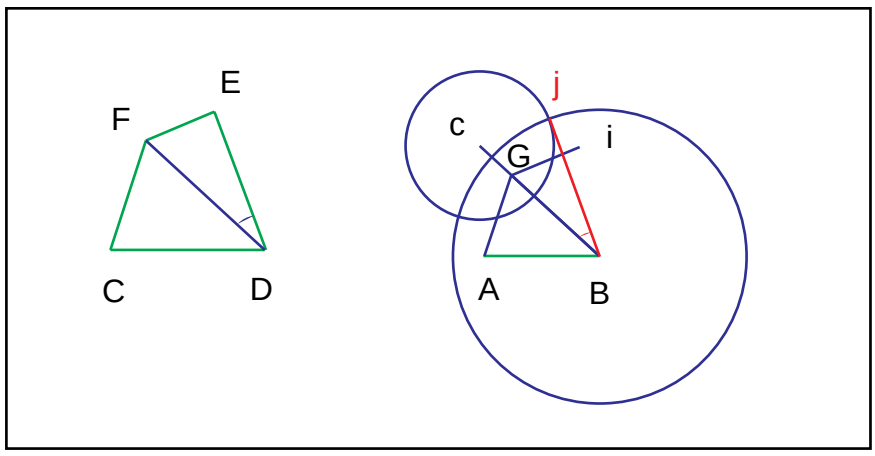


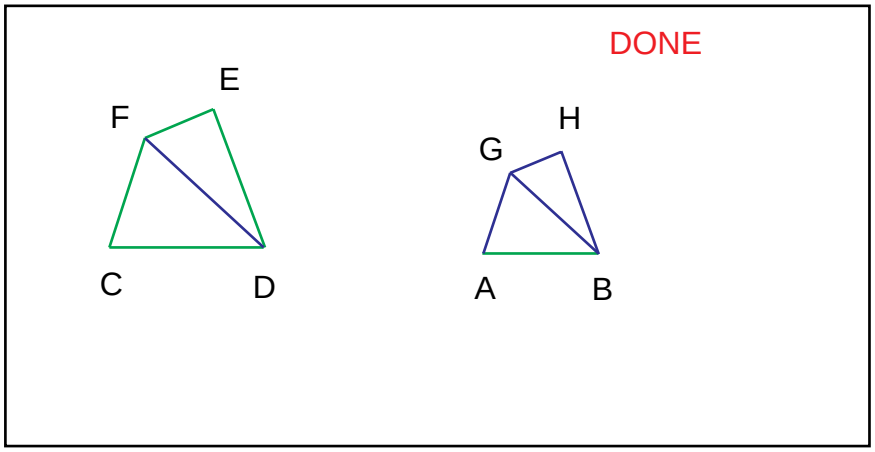
Connect the upper crossing point j to B.

Let H be the crossing point of Bj and Gi.
Cleanup.
RETURN to VI.18:20.



VI.18:41. - Therefore the rectilineal figure AH is similar to the rectilineal figure CE.

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