# Convex Hull

## Extreme Points
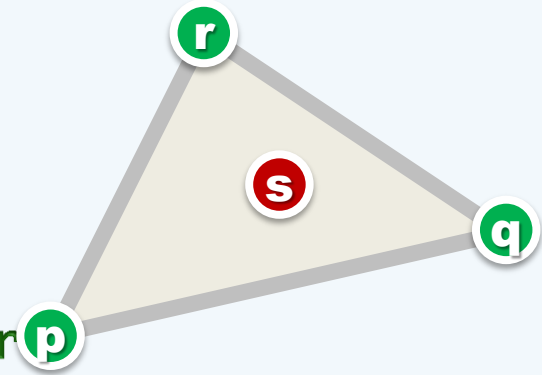
## - To-Left Test

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θ1-B-θ4

❖ How to test if a point s lies ⌐inside⌐ a given triangle Δ(p, q, r)?

❖ Note that

s lies inside the triangle  iff

all the 3 tests return ⌐TURE/FALSE⌐

when the triangle is given in ⌐CCW/CW⌐ order
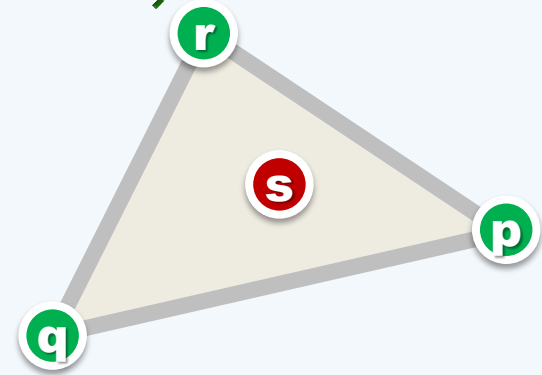
❖ bool ⌐InTriangle⌐( Point p, Point q, Point r, Point s )

```
bool pqLeft = ToLeft( p, q, s );

bool qrLeft = ToLeft( q, r, s );

bool rpLeft = ToLeft( r, p, s );

return ( pqLeft == qrLeft ) && ( qrLeft == rpLeft );
```
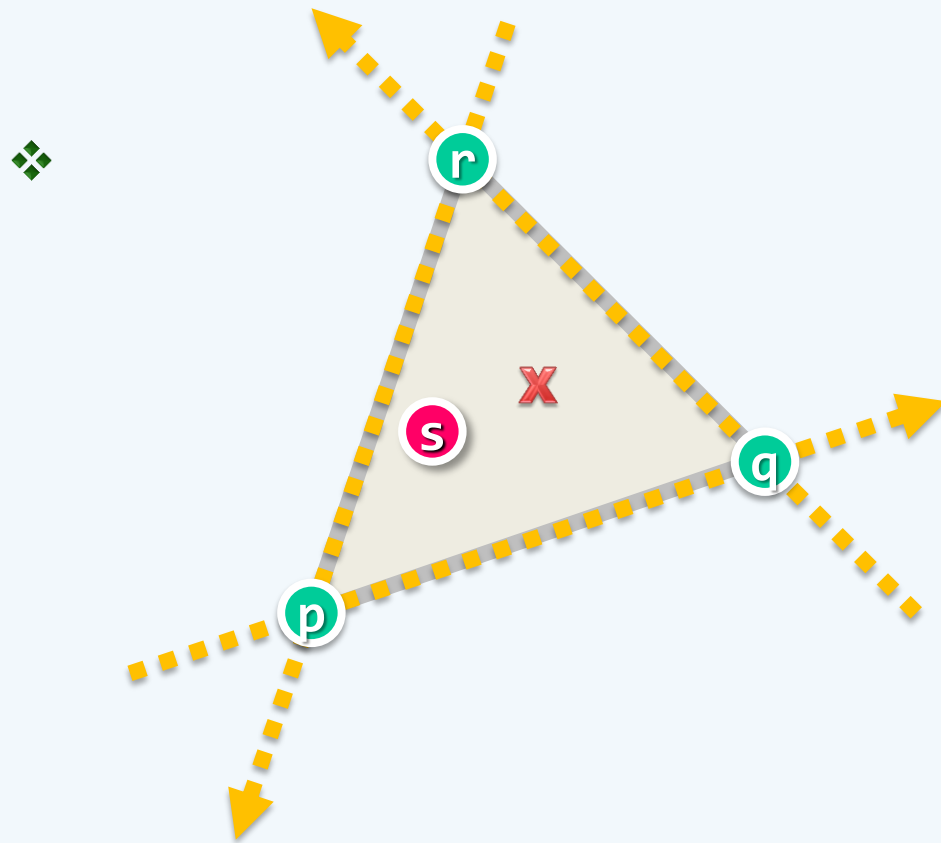
❖                              / TRUE    if s lies $\boxed{\text{left}}$ to $\boxed{\text{directed line}}$ ab

        ToLeft(a, b, s) = -|

                              \ FALSE   otherwise

❖                    InTriangle(p, q, r, s)  iff

                  ToLeft(p, q, s) ==

                  ToLeft(q, r, s) ==

                  ToLeft(r, p, s) ==  TRUE