

# While Loops (annotation template)

Q P D

```
while ( B ) {
```

    C

```
}
```

Q Q D

## While Loops

Prove that the following program satisfies the given triple under partial correctness.

$\{ (x \geq 0) \}$

$y = 1;$

$z = 0;$

while  $(z \neq x) \{$

$z = z + 1;$

$y = y * z;$

$\}$

$\{ (y = x!) \}$

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$\{y = x!\} D$

## While Loops

Prove that the following program satisfies the given triple under partial correctness.

$$\{ (n \geq 0) \wedge (a \geq 0) \}$$

$$s = 1;$$

$$i = 0;$$

while ( $i < n$ ) {

$$s = s * a;$$

$$i = i + 1;$$

}

$$\{ s = a^n \}$$

## While Loops

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$$s = 1;$$
$$i = 0;$$
$$\text{while } (i < n) \{$$
$$s = s * a;$$
$$i = i + 1;$$
$$\}$$
$$\{ s = a^n \}$$

## While-Loops

Prove that the following program satisfies the given triple under partial correctness.

$\{ (n \geq 0) \wedge (a \geq 0) \}$

$S = 1;$

$i = 0;$

while  $(i < n)$  {

$S = S * a;$

$i = i + 1;$

}

$\{ S = a^n \}$