EECS 219C: Formal Methods

Modeling for Verification: Example Used in Lecture

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Example: Interrupt-Driven S/W

```c
volatile uint timerCount = 0;
void ISR(void) {
    ... disable interrupts
    if(timerCount != 0) {
        timerCount--;
    }
    ... enable interrupts
}
int main(void) {
    // initialization code
    SysTickIntRegister(&ISR);
    ... // other init
    timerCount = 2000;
    while(timerCount != 0) {
        ... code to run for 2 seconds
    }
    ... whatever comes next
}
```

Question: Assuming interrupt can occur infinitely often, is position C always reached?
volatile uint timerCount = 0;
void ISR(void) {
    ... disable interrupts
    if (timerCount != 0) {
        timerCount--;
    }
    ... enable interrupts
}

int main(void) {
    // initialization code
    SysTickIntRegister(&ISR);
    ... // other init
    timerCount = 2000;
    while (timerCount != 0) {
        ... code to run for 2 seconds
    }
    whatever comes next
}

Which form of composition is the right thing to do here?
Asynchronous Composition

\[ S_C = S_A \times S_B \]

This has transitions that will not occur in practice, such as A,D to B,D. Interrupts have priority over application code.