Worksheet #18 Solution

(From Lecture #18 given on 03/25/2019)

Worksheet problem: : Find a spill-free register allocation for symbolic registers s_A, s_B, s_C in the program shown below, assuming that there are $k = 2$ physical registers available.

```
switch ( ... ) {
        case 0:
    i1: sA := ...
    i2: sB := ...
    i3: ... := sA op sB
        break;
        case 1:
    i4: sB := ...
    i5: sC := ...
    i6: ... := sB op sC
        break;
        case 2:
    i7: sA := ...
    i8: sC := ...
    i9: ... := sA op sC
        break;
}
```

Worksheet problem: : Find a spill-free register allocation for symbolic registers s_A, s_B, s_C in the program shown below, assuming that there are $k = 2$ physical registers available.

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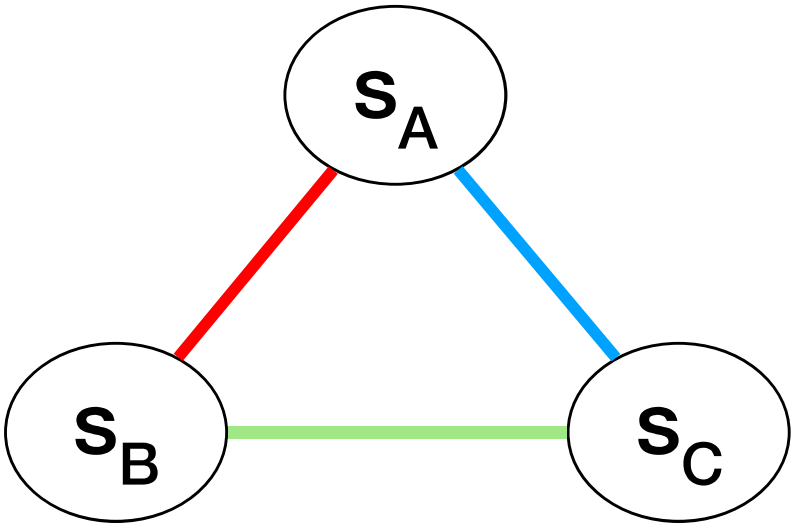
        case 0:
i1:  sA := ...
i2:  sB := ...
i3:  ... := sA op sB
        break;
        case 1:
i4:  sB := ...
i5:  sC := ...
i6:  ... := sB op sC
        break;
        case 2:
i7:  sA := ...
i8:  sC := ...
i9:  ... := sA op sC
        break;
}
```

s_A and s_B have conflicting live ranges.

s_B and s_C have conflicting live ranges.

s_A and s_C have conflicting live ranges.



Interference graph needs 3 colors

Worksheet problem: : Find a spill-free register allocation for symbolic registers s_A, s_B, s_C in the program shown below, assuming that there are $k = 2$ physical registers available.

switch (. . .) {

case 0:

i_1: s_A := . . .
i_2: s_B := . . .
i_3: . . . := s_A *op* s_B

break;

case 1:

i_4: s_B := . . .
i_5: s_C := . . .
i_6: . . . := s_B *op* s_C

break;

case 2:

i_7: s_A := . . .
i_8: s_C := . . .
i_9: . . . := s_A *op* s_C

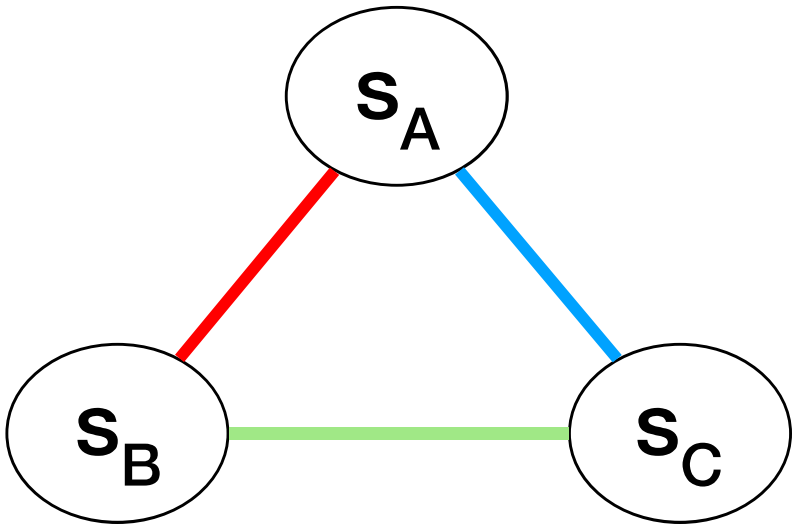
break;

}

s_A : R0
s_B : R1

s_B : R0
s_C : R1

s_A : R0
s_C : R1



However, it is possible to do a spill-free register allocation with just 2 registers

(no register copy statements needed in this case)