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////////////////////////////////////  
// 15-745 SI4 Assignment 3  
// Group: bhumbers, psuresh  
////////////////////////////////////  
  
//Tests LICM for nested loops  
  
int main(void)  
{  
    int x = 5;  
    int y = 1;  
    int r = 10;  
    for (int i = 0; i < 2*x; i++) {  
        for (int j = 0; j < 12345*y; j++) {  
            r += y;  
        }  
    }  
    return r;  
};
```

```
; ModuleID = 'nested_main.bc'
target datalayout = "e-p:64:64:64-i1:8:8-i8:8:8-i16:16:16-i32:32:32-i64:64:64-f32:32:32-f64:64:64-v64:64:64-v128:128:128-a0:0:64-s0:64:64-f80:128:128-n8:16:32:64-S128"
target triple = "x86_64-unknown-linux-gnu"

; Function Attrs: nounwind uwtable
define i32 @main() #0 {
entry:
    br label %for.cond

for.cond:                                     ; preds = %for.inc5, %entry
    %r.0 = phi i32 [ 10, %entry ], [ %r.1, %for.inc5 ]
    %i.0 = phi i32 [ 0, %entry ], [ %inc6, %for.inc5 ]
    %mul = mul nsw i32 2, 5
    %cmp = icmp slt i32 %i.0, %mul
    br i1 %cmp, label %for.body, label %for.end7

for.body:                                     ; preds = %for.cond
    br label %for.cond1

for.cond1:                                    ; preds = %for.inc, %for.body
    %r.1 = phi i32 [ %r.0, %for.body ], [ %add, %for.inc ]
    %j.0 = phi i32 [ 0, %for.body ], [ %inc, %for.inc ]
    %mul2 = mul nsw i32 12345, 1
    %cmp3 = icmp slt i32 %j.0, %mul2
    br i1 %cmp3, label %for.body4, label %for.end

for.body4:                                    ; preds = %for.cond1
    %add = add nsw i32 %r.1, 1
    br label %for.inc

for.inc:                                      ; preds = %for.body4
    %inc = add nsw i32 %j.0, 1
    br label %for.cond1

for.end:                                      ; preds = %for.cond1
    br label %for.inc5

for.inc5:                                    ; preds = %for.end
    %inc6 = add nsw i32 %i.0, 1
    br label %for.cond

for.end7:                                    ; preds = %for.cond
    ret i32 %r.0
}

attributes #0 = { nounwind uwtable "less-precise-fpmad"="false" "no-frame-pointer-elim"="true" "no-frame-pointer-elim-non-leaf" "no-in
fs-fp-math"="false" "no-nans-fp-math"="false" "stack-protector-buffer-size"="8" "unsafe-fp-math"="false" "use-soft-float"="false" }

!llvm.ident = !{!0}

!0 = metadata !{metadata !"clang version 3.4 (tags/RELEASE_34/final)"}
```

```
; ModuleID = 'nested_main-opt.bc'
target datalayout = "e-p:64:64:64-i1:8:8-i8:8:8-i16:16:16-i32:32:32-i64:64:64-f32:32:32-f64:64:64-v64:64:64-v128:128:128-a0:0:64-s0:64:64-f80:128:128-n8:16:32:64-S128"
target triple = "x86_64-unknown-linux-gnu"

; Function Attrs: nounwind uwtable
define i32 @main() #0 {
entry:
    %mul = mul nsw i32 2, 5
    br label %for.cond

for.cond:                                     ; preds = %for.inc5, %entry
    %r.0 = phi i32 [ 10, %entry ], [ %r.1, %for.inc5 ]
    %i.0 = phi i32 [ 0, %entry ], [ %inc6, %for.inc5 ]
    %cmp = icmp slt i32 %i.0, %mul
    br i1 %cmp, label %for.body, label %for.end7

for.body:                                     ; preds = %for.cond
    %mul2 = mul nsw i32 12345, 1
    br label %for.cond1

for.cond1:                                   ; preds = %for.inc, %for.body
    %r.1 = phi i32 [ %r.0, %for.body ], [ %add, %for.inc ]
    %j.0 = phi i32 [ 0, %for.body ], [ %inc, %for.inc ]
    %cmp3 = icmp slt i32 %j.0, %mul2
    br i1 %cmp3, label %for.body4, label %for.end

for.body4:                                   ; preds = %for.cond1
    %add = add nsw i32 %r.1, 1
    br label %for.inc

for.inc:                                     ; preds = %for.body4
    %inc = add nsw i32 %j.0, 1
    br label %for.cond1

for.end:                                     ; preds = %for.cond1
    br label %for.inc5

for.inc5:                                    ; preds = %for.end
    %inc6 = add nsw i32 %i.0, 1
    br label %for.cond

for.end7:                                    ; preds = %for.cond
    ret i32 %r.0
}

attributes #0 = { nounwind uwtable "less-precise-fpmad"="false" "no-frame-pointer-elim"="true" "no-frame-pointer-elim-non-leaf" "no-in
fs-fp-math"="false" "no-nans-fp-math"="false" "stack-protector-buffer-size"="8" "unsafe-fp-math"="false" "use-soft-float"="false" }

!llvm.ident = !{!0}

!0 = metadata !{metadata !"clang version 3.4 (tags/RELEASE_34/final)"}
```