```
////////////////////////////////////////////////////////////////////////////
// 15-745 S14 Assignment 3
// Group: bhumbers, psuresh
////////////////////////////////////////////////////////////////////////////

//Tests LICM for doubly 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++) {
      for (int k = 0; k < 5; k++) {
        int a = 5;
        r += a + y;
      }
    }
  }
  return r;
};
```

```
; ModuleID = 'double_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.inc12, %entry
  %r.0 = phi i32 [ 10, %entry ], [ %r.1, %for.inc12 ]
  %i.0 = phi i32 [ 0, %entry ], [ %inc13, %for.inc12 ]
  %mul = mul nsw i32 2, 5
  %cmp = icmp slt i32 %i.0, %mul
  br i1 %cmp, label %for.body, label %for.end14

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

for.cond1:                                        ; preds = %for.inc9, %for.body
  %r.1 = phi i32 [ %r.0, %for.body ], [ %r.2, %for.inc9 ]
  %j.0 = phi i32 [ 0, %for.body ], [ %inc10, %for.inc9 ]
  %mul2 = mul nsw i32 12345, 1
  %cmp3 = icmp slt i32 %j.0, %mul2
  br i1 %cmp3, label %for.body4, label %for.end11

for.body4:                                        ; preds = %for.cond1
  br label %for.cond5

for.cond5:                                        ; preds = %for.inc, %for.body4
  %r.2 = phi i32 [ %r.1, %for.body4 ], [ %add8, %for.inc ]
  %k.0 = phi i32 [ 0, %for.body4 ], [ %inc, %for.inc ]
  %cmp6 = icmp slt i32 %k.0, 5
  br i1 %cmp6, label %for.body7, label %for.end

for.body7:                                        ; preds = %for.cond5
  %add = add nsw i32 5, 1
  %add8 = add nsw i32 %r.2, %add
  br label %for.inc

for.inc:                                          ; preds = %for.body7
  %inc = add nsw i32 %k.0, 1
  br label %for.cond5

for.end:                                          ; preds = %for.cond5
  br label %for.inc9

for.inc9:                                         ; preds = %for.end
  %inc10 = add nsw i32 %j.0, 1
  br label %for.cond1

for.end11:                                        ; preds = %for.cond1
  br label %for.inc12

for.inc12:                                        ; preds = %for.end11
  %inc13 = add nsw i32 %i.0, 1
  br label %for.cond

for.end14:                                        ; 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 = 'double_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.inc12, %entry
  %r.0 = phi i32 [ 10, %entry ], [ %r.1, %for.inc12 ]
  %i.0 = phi i32 [ 0, %entry ], [ %inc13, %for.inc12 ]
  %cmp = icmp slt i32 %i.0, %mul
  br i1 %cmp, label %for.body, label %for.end14

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

for.cond1:                                        ; preds = %for.inc9, %for.body
  %r.1 = phi i32 [ %r.0, %for.body ], [ %r.2, %for.inc9 ]
  %j.0 = phi i32 [ 0, %for.body ], [ %inc10, %for.inc9 ]
  %cmp3 = icmp slt i32 %j.0, %mul2
  br i1 %cmp3, label %for.body4, label %for.end11

for.body4:                                        ; preds = %for.cond1
  br label %for.cond5

for.cond5:                                        ; preds = %for.inc, %for.body4
  %r.2 = phi i32 [ %r.1, %for.body4 ], [ %add8, %for.inc ]
  %k.0 = phi i32 [ 0, %for.body4 ], [ %inc, %for.inc ]
  %cmp6 = icmp slt i32 %k.0, 5
  br i1 %cmp6, label %for.body7, label %for.end

for.body7:                                        ; preds = %for.cond5
  %add = add nsw i32 5, 1
  %add8 = add nsw i32 %r.2, %add
  br label %for.inc

for.inc:                                          ; preds = %for.body7
  %inc = add nsw i32 %k.0, 1
  br label %for.cond5

for.end:                                          ; preds = %for.cond5
  br label %for.inc9

for.inc9:                                         ; preds = %for.end
  %inc10 = add nsw i32 %j.0, 1
  br label %for.cond1

for.end11:                                        ; preds = %for.cond1
  br label %for.inc12

for.inc12:                                        ; preds = %for.end11
  %inc13 = add nsw i32 %i.0, 1
  br label %for.cond

for.end14:                                        ; 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)"}
```