```
%11 = sext i32 %4 to i64
                                                                                                                                                       %12 = icmp slt i64 %11, 32
                                                                                                                                                       %13 = select i1 %12, i64 %11, i64 32
                                                                                                                                                       %14 = \text{sext i} 32 \% 3 \text{ to i} 64
                                                                                                                                                       %15 = icmp slt i64 %14, 8
                                                                                                                                                       %16 = select i1 %15, i64 %14, i64 8
                                                                                                                                                       %mul.i.i = shl i64 %7, 5
                                                                                                                                                       %mul3.i.i = shl i64 %8, 3
                                                                                                                                                       %cmp638.i = icmp sgt i32 %5, 0, !llvm.access.group !12
                                                                                                                                                       %wide.trip.count.i = zext i32 %5 to i64
                                                                                                                                                       %17 = icmp ugt i64 %13, 1
                                                                                                                                                       %umax = select i1 %17, i64 %13, i64 1
                                                                                                                                                       %18 = icmp ugt i64 %16, 1
                                                                                                                                                       %umax3 = select i1 %18, i64 %16, i64 1
                                                                                                                                                       %min.iters.check = icmp ult i64 %umax3, 8
                                                                                                                                                       br i1 %min.iters.check, label
                                                                                                                                                       ... %pregion for entry.pregion for init.i.preheader, label %vector.ph
                                                                                                                                                                                             vector.ph:
                                                                                                                                                                                              %n.vec = and i64 %umax3, -8
                                                                                                                                                                                              %broadcast.splatinsert = insertelement <8 x i64> undef, i64 %mul3.i.i, i32 0
                                                                                                                                                                                              %broadcast.splat = shufflevector <8 x i64> %broadcast.splatinsert, <8 x i64>
                                                                                                                                                                                              ... undef, < 8 \times i32 > zeroinitializer
                                                                                                                                                                                             %broadcast.splatinsert5 = insertelement <8 x i32> undef, i32 %4, i32 0
                                                                                                                                                                                             %broadcast.splat6 = shufflevector <8 x i32> %broadcast.splatinsert5, <8 x
                                                                                                                                                                                             ... i32> undef, <8 x i32> zeroinitializer
                                                                                                                                                                                             %broadcast.splatinsert7 = insertelement <8 x i32> undef, i32 %5, i32 0
                                                                                                                                                                                              %broadcast.splat8 = shufflevector <8 x i32> %broadcast.splatinsert7, <8 x
                                                                                                                                                                                             ... i32> undef, <8 x i32> zeroinitializer
                                                                                                                                                                                             %broadcast.splatinsert10 = insertelement <8 x i64> undef, i64 %mul.i.i, i32 0
                                                                                                                                                                                              %broadcast.splat11 = shufflevector <8 x i64> %broadcast.splatinsert10, <8 x
                                                                                                                                                                                             ... i64> undef, <8 x i32> zeroinitializer
                                                                                                                                                                                             %broadcast.splatinsert18 = insertelement <8 x i64> undef, i64 %11, i32 0
                                                                                                                                                                                             %broadcast.splat19 = shufflevector <8 x i64> %broadcast.splatinsert18, <8 x
                                                                                                                                                                                             ... i64> undef, <8 x i32> zeroinitializer
                                                                                                                                                                                              %broadcast.splatinsert21 = insertelement <8 x i64> undef, i64
                                                                                                                                                                                             ... %wide.trip.count.i, i32 0
                                                                                                                                                                                             %broadcast.splat22 = shufflevector <8 x i64> %broadcast.splatinsert21, <8 x
                                                                                                                                                                                             ... i64> undef, <8 x i32> zeroinitializer
                                                                                                                                                                                             %broadcast.splatinsert25 = insertelement <8 x i64> undef, i64 %umax, i32 0
                                                                                                                                                                                              %broadcast.splat26 = shufflevector <8 x i64> %broadcast.splatinsert25, <8 x
                                                                                                                                                                                             ... i64> undef, <8 x i32> zeroinitializer
                                                                                                                                                                                              br label %vector.body
                                                                                                                                                                                                                  vector.body:
                                                                                                                                                                                                                   %index = phi i64 [ 0, %vector.ph ], [ %index.next, %pregion_for_end.i27 ]
                                                                                                                                                                                                                   %vec.ind = phi <8 x i64> [ <i64 0, i64 1, i64 2, i64 3, i64 4, i64 5, i64 6,
                                                                                                                                                                                                                  ... i64 7>, %vector.ph], [%vec.ind.next, %pregion_for_end.i27]
                                                                                                                                                                                                                   %19 = add <8 x i64> %vec.ind, %broadcast.splat, !llvm.access.group !12
                                                                                                                                                                                                                   \%20 = \text{trunc} < 8 \times i64 > \%19 \text{ to } < 8 \times i32 >, !llvm.access.group !12
                                                                                                                                                                                                                   %21 = mul nsw <8 x i32> %broadcast.splat6, %20, !llvm.access.group !12
                                                                                                                                                                                                                   %22 = mul nsw <8 x i32> %broadcast.splat8, %20
                                                                                                                                                                                                                   %23 = \text{sext} < 8 \times i32 > %22 \text{ to } < 8 \times i64 > 
                                                                                                                                                                                                                   br label %pregion for entry.entry.i9
                                                                                                                                                                                                                 pregion for entry.entry.i9:
                                                                                                                                                                                                                 %vec.phi = phi <8 x i64> [ zeroinitializer, %vector.body ], [ %40,
                                                                                                                                                                                                                  ... %if.end.r exit.i24 ]
                                                                                                                                                                                                                 %24 = add <8 x i64> %vec.phi, %broadcast.splat11, !llvm.access.group !12 %25 = trunc <8 x i64> %24 to <8 x i32>, !llvm.access.group !12
                                                                                                                                                                                                                  %26 = add nsw <8 x i32> %21, %25, !llvm.access.group !12
                                                                                                                                                                                                                  %27 = sext <8 x i32> %26 to <8 x i64>, !llvm.access.group !12
                                                                                                                                                                                                                  \%28 = getelementptr inbounds float, float* \%2, <8 \times i64 > \%27,
                                                                                                                                                                                                                 ...!llvm.access.group!12
                                                                                                                                                                                                                 call void @llvm.masked.scatter.v8f32.v8p0f32(<8 x float> zeroinitializer, <8
                                                                                                                                                                                                                 ... x float*> %28, i32 4, <8 x i1> <i1 true, i1 true, i1 true, i1 true, i1 true,
                                                                                                                                                                                                                 ... i1 true, i1 true, i1 true>), !tbaa !15, !llvm.access.group !12
                                                                                                                                                                                                                 br i1 %cmp638.i, label %for.body.lr.ph.i14, label %if.end.r exit.i24
                                                                                                                                                                  for.body.lr.ph.i14:
                                                                                                                                                                  %29 = shl <8 x i64> %24, <i64 32, i64 32, i64 32, i64 32, i64 32, i64 32, i64 32,
                                                                                                                                                                  ... i64 32, i64 32>, !llvm.access.group !12
                                                                                                                                                                  \%30 = ashr exact < 8 \times i64 > \%29, < i64 32, i64 32, i64 32, i64 32, i64 32, i64 32, i64
                                                                                                                                                                  ... 32, i64 32, i64 32>, !llvm.access.group !12
                                                                                                                                                                  br label %for.body.i15
                                                                                                                                                        for.body.i15:
                                                                                                                                                         \text{%vec.phi16} = \text{phi} < 8 \times \text{i64} > [\text{\%37}, \text{\%for.body.i15}], [\text{zeroinitializer},]
                                                                                                                                                         ... %for.body.lr.ph.i14 ]
                                                                                                                                                         %vec.phi17 = phi <8 x float> [ %36, %for.body.i15 ], [ zeroinitializer,
                                                                                                                                                         ... %for.body.lr.ph.i14 ]
                                                                                                                                                         %31 = add nsw <8 x i64> %vec.phi16, %23, !llvm.access.group !12
                                                                                                                                                         %32 = getelementptr inbounds float, float* %0, <8 x i64> %31,
                                                                                                                                                         ...!llvm.access.group!12
                                                                                                                                                         %wide.masked.gather = call <8 x float> @llvm.masked.gather.v8f32.v8p0f32(<8
                                                                                                                                                         ... x float*> %32, i32 4, <8 x i1> <i1 true, i1 
                                                                                                                                                         ... i1 true, i1 true, i1 true>, <8 x float> undef), !tbaa !15, !llvm.access.group
                                                                                                                                                         %33 = mul nsw <8 x i64> %vec.phi16, %broadcast.splat19, !llvm.access.group
                                                                                                                                                         ... !12
                                                                                                                                                         %34 = add nsw <8 x i64> %33, %30, !llvm.access.group !12
                                                                                                                                                         %35 = \text{getelementptr inbounds float, float* } \%1, <8 \text{ x } i64 > \%34,
                                                                                                                                                         ...!llvm.access.group!12
                                                                                                                                                         %wide.masked.gather20 = call <8 x float>
                                                                                                                                                         ... @llvm.masked.gather.v8f32.v8p0f32(<8 x float*> %35, i32 4, <8 x i1> <i1 true,
                                                                                                                                                        ... i1 true, i7 true, i1 true,
                                                                                                                                                         ... undef), !tbaa !15, !llvm.access.group !12
                                                                                                                                                         %36 = call <8 x float> @llvm.fmuladd.v8f32(<8 x float> %wide.masked.gather,
                                                                                                                                                         ... <8 x float> %wide.masked.gather20, <8 x float> %vec.phi17),
                                                                                                                                                         ...!llvm.access.group!12
                                                                                                                                                         call void @llvm.masked.scatter.v8f32.v8p0f32(<8 x float> %36, <8 x float*>
                                                                                                                                                        ... %28, i32 4, <8 x i1> <i1 true, i1 t
                                                                                                                                                         ... i1 true, i1 true>), !tbaa !15, !llvm.access.group !12
                                                                                                                                                         %37 = add nuw nsw <8 x i64> %vec.phi16, <i64 1, i64 1, i64 1, i64 1, i64 1,
                                                                                                                                                         ... i64 1, i64 1, i64 1>, !llvm.access.group !12

%38 = icmp eq <8 x i64> %37, %broadcast.splat22, !llvm.access.group !12

%39 = extractelement <8 x i1> %38, i32 0
                                                                                                                                                         br i1 %39, label %if.end.r exit.i24.loopexit, label %for.body.i15
                                                                                                                                                                                                                 if.end.r exit.i24.loopexit:
                                                                                                                                                                                                                  br label %if.end.r exit.i24
                                                                                                                                                                                                                  if.end.r exit.i24:
                                                                                                                                                                                                                  %40 = add nuw <8 x i64> %vec.phi, <i64 1, i64 1, i64 1, i64 1, i64 1, i64 1,
                                                                                                                                                                                                                  %41 = icmp eq <8 x i64> %40, %broadcast.splat26
%42 = extractelement <8 x i1> %41, i32 0
                                                                                                                                                                                                                  br i1 %42, label %pregion for end.i27, label %pregion for entry.entry.i9
                                                                                                                                                                                              pregion for end.i27:
                                                                                                                                                                                               %index.next = add i64 %index, 8
                                                                                                                                                                                               %vec.ind.next = add <8 x i64> %vec.ind, <i64 8, i64 8, i64 8, i64 8, i64 8,
                                                                                                                                                                                               ... i64 8, i64 8, i64 8>
                                                                                                                                                                                               %43 = icmp eq i64 %index.next, %n.vec
br i1 %43, label %middle.block, label %vector.body, !llvm.loop !19
                                                                                                                                                                                  middle.block:
                                                                                                                                                                                  %cmp.n = icmp eq i64 %umax3, %n.vec
                                                                                                                                                                                  br i1 %cmp.n, label %mm3 kernel2.exit, label
                                                                                                                                                                                  ... %pregion_for_entry.pregion_for_init.i.preheader
                                                                                      pregion_for_entry.pregion_for_init.i.preheader:
    %_local_id_y.0.ph = phi i64 [ 0, %10 ], [ %n.vec, %middle.block ]
                                                                                       br label %pregion for entry.pregion for init.i
                                                                           pregion_for_entry.pregion_for_init.i:
                                                                            %_local_id_y.0 = phi i64 [ %54, %pregion_for_end.i ], [ %_local_id_y.0.ph, ... %pregion_for_entry.pregion_for_init.i.preheader ] %add6.i.i = add i64 %_local_id_y.0, %mul3.i.i, !llvm.access.group !12 %conv2.i = trunc i64 %add6.i.i to i32, !llvm.access.group !12
                                                                            %mul.i = mul nsw i32 %conv2.i, %4, !llvm.access.group !12 %mul8.i = mul nsw i32 %conv2.i, %5
                                                                             %44 = sext i32 %mul8.i to i64
                                                                             br label %pregion for entry.entry.i
                                                        pregion for entry.entry.i:
                                                        % local id \bar{x}.0 = phi i64 [ 0, %pregion for entry.pregion for init.i ], [
                                                        ... \( \frac{8}{5} \), \( \frac{8}{6} \) if end. r exit. i ]
                                                        %add1.i.i = add i64 %_local_id_x.0, %mul.i.i, !llvm.access.group !12
                                                        %conv.i = trunc i64 %add1.i.i to i32, !llvm.access.group !12
                                                        %add.i = add nsw i32 %mul.i, %conv.i, !llvm.access.group !12
                                                        %idxprom.i = sext i32 %add.i to i64, !llvm.access.group !12
                                                        %arrayidx.i = getelementptr inbounds float, float* %2, i64 %idxprom.i,
                                                        ...!llvm.access.group!12
                                                        store float 0.000000e+00, float* %arrayidx.i, align 4, !tbaa !15,
                                                        ...!llvm.access.group!12
                                                        br i1 %cmp638.i, label %for.body.lr.ph.i, label %if.end.r_exit.i,
                                                        ...!llvm.access.group!12
                            for.body.lr.ph.i:
                             %sext.i = shl i64 %add1.i.i, 32, !llvm.access.group !12
                             %45 = ashr exact i64 %sext.i, 32, !llvm.access.group !12
                             br label %for.body.i, !llvm.access.group !12
for.body.i:
 %indvars.iv.next.i2 = phi i64 [ %indvars.iv.next.i, %for.body.i ], [ 0,
 ... %for.body.lr.ph.i ]
%46 = phi float [ %52, %for.body.i ], [ 0.000000e+00, %for.body.lr.ph.i ]
%47 = add nsw i64 %indvars.iv.next.i2, %44, !llvm.access.group !12
%arrayidx11.i = getelementptr inbounds float, float* %0, i64 %47,
 ..!llvm.access.group!12
%48 = load float, float* %arrayidx11.i, align 4, !tbaa !15,
 ...!llvm.access.group!12
%49 = mul nsw i64 %indvars.iv.next.i2, %11, !llvm.access.group !12
 %50 = add nsw i64 %49, %45, !llvm.access.group !12
%arrayidx15.i = getelementptr inbounds float, float* %1, i64 %50,
 ...!llvm.access.group!12
%51 = load float, float* %arrayidx15.i, align 4, !tbaa !15,
 ...!llvm.access.group!12
%52 = tail call float @llvm.fmuladd.f32(float %48, float %51, float %46) #5,
...!llvm.access.group!12
store float %52, float* %arrayidx.i, align 4, !tbaa !15, !llvm.access.group
... !12
%indvars.iv.next.i = add nuw nsw i64 %indvars.iv.next.i2, 1,
 ...!llvm.access.group!12
 %exitcond.not.i = icmp eq i64 %indvars.iv.next.i, %wide.trip.count.i,
 ...!llvm.access.group!12
br i1 %exitcond.not.i, label %if.end.r exit.i.loopexit, label %for.body.i,
...!llvm.loop!22,!llvm.access.group!12
                                                                                                    F
                                                      if.end.r exit.i.loopexit:
                                                      br label %if.end.r exit.i
                                                                                   if.end.r exit.i:
                                                                                   \%53 = add nuw i64 \% local id x.0, 1
                                                                                    %exitcond.not = icmp eq i6\overline{4} %53, %umax
                                                                                   br i1 %exitcond.not, label %pregion for end.i, label
                                                                                    ... %pregion for entry.entry.i, !llvm.loop 124
                                                                                              pregion for end.i:
                                                                                               \%54 = add nuw i64 % local id y.0, 1
                                                                                               %exitcond4.not = icm\bar{p} eq i\bar{6}4 %54, %umax3
                                                                                              br i1 %exitcond4.not, label %mm3 kernel2.exit.loopexit, label
                                                                                               ... %pregion for entry.pregion for init.i, !llvm.loop !27
                                                                                                                            mm3 kernel2.exit.loopexit:
                                                                                                                             br label %mm3 kernel2.exit
                                                                                                                                                     mm3 kernel2.exit:
```

%10: