

The Packing Algorithm in VeGen

1 Pseudo Code in The Paper

Algorithm 1: Find the set of (non-load) packs that produce a given vector operand x . Load packs are found separately by enumeration.

Input :

x : The vector operand that we need to produce
 M : The match table, which contains the mapping $\langle \text{live-out}(m), \text{operation}(m) \rangle \mapsto m$ for each match m .
 I : A list of instruction descriptions.

Output: A (potentially empty) set of producer packs of x .

```
1 if there are dependent values in  $x$  then
2   | return {}
3 end
4  $producers \leftarrow \{\}$ 
5 for  $vinst \in I$  do
6   |  $matches \leftarrow []$ 
7   | for  $i \leftarrow 1$  to number of lanes of  $vinst$  do
8     |  $f \leftarrow$  the  $i$ 'th operation of  $vinst$ 
9     |  $m \leftarrow M[\langle x_i, f \rangle]$ 
10    | if  $x_i$  is don't-care or  $m$  is not null then
11      | append  $m$  to  $matches$ 
12    | end
13  | end
14  | if  $|matches| =$  number of lanes of  $vinst$  then
15    |  $producers \leftarrow producers \cup \text{pack}(vinst, matches)$ 
16  | end
17 end
18 return  $producers$ 
```

2 AccessLayoutInfo

3 BlockOrdering

4 Packer

In the VeGen project, I have listed all the header files and marked their def-use relationships. To understand all the concepts defined by the author, it is necessary to read these header files in a top-down manner.

header		user	
InstSema.h		['VectorPackContext.h', 'Packer.h', 'IRVec.h', 'MatchManager.h']	
VectorPackContext.h		['Packer.h', 'VectorPack.h']	
LoopUnrolling.h		['UnrollFactor.h']	
VectorPack.h		['VectorPackSet.h']	
VLoop.h		['Packer.h']	
DependenceAnalysis.h		['Packer.h']	
ControlDependence.h		['Packer.h']	
MatchManager.h		['Packer.h']	
Reduction.h		['VectorPack.h']	
IntrinsicBuilder.h		['InstSema.h']	