Perfect Branch Prediction vs. Perfect Data Cache

Assumptions

- Single issue out-of-order processor, unlimited window size
- 10 cycle branch delay
- Single cycle access, nonblocking cache, 1 word block size
- Memory accesses have 10% miss rate
- 100 cycle main memory access
- No structural hazards

```
for (p=head; p!=NIL;)
    if (p->value == 0)
        p = p->link1;
    else
        p = p->link2;
```

```
        J       test
loop:   lw      $s0, 0($s1)
        bnez    $s0, link2      ; 50% misprediction
        lw      $s1, 4($s1)
        J       test
link2:  lw      $s1, 8($s1)
test:   bnez    $s1, loop       ; 0% misprediction
```

Assume 100,000 iterations

Which performs better perfect branch prediction or perfect cache?