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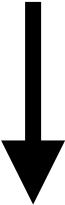
Optimized
Machine Code

Machine code

Optimizing Compiler

Baseline Compiler









Cache of
shortcuts

```
add({x: 42});
```

```
add({x: 7});
```

```
add({x: 123});
```

AST





$$\text{add}(\{y : 17\}) ;$$

Re-compile “hot” functions

Optimize on wrong speculation

Baseline x86 assembly

```
67126 name = Add
67127 compiler = turbofan
67128 Instructions (size = 822)
67129 0x23fafe40 0 55 push ebp
67130 0x23fafe41 1 80e5 mov ebp,esp
67131 0x23fafe43 3 5a15 push 0x15
67132 0x23fafe45 5 83ec20 sub esp,0x20
67133 0x23fafe48 8 8fbf540f01 movzx_w ecx,[edi+ecx*1+0x1]
67134 0x23fafe4d d 8b5d80 mov ebx,[ebp+0x8]
67135 0x23fafe50 10 8b1403 mov ebx,[ebx+0x3]
67136 0x23fafe53 13 8975f8 mov [ebp+0x8],esi
67137 0x23fafe56 16 8b73fc mov esi,[ebx+0x4]
67138 0x23fafe59 19 8fbf7c0f03 movzx_w edi,[edi+ecx*1+0x3]
67139 0x23fafe5e 1e 894d78 mov [ebp+0x18],ecx
67140 0x23fafe61 21 8b4b78 mov ebx,[ebx+0x8]
67141 0x23fafe64 24 8b4b17 mov ebx,[ecx+0x17]
67142 0x23fafe67 27 8b4b08 mov ebx,[ecx+0x8]
67143 0x23fafe6a 2a 895df4 mov [ebp+0xc],ebx
67144 0x23fafe6d 2d 8fc201 test_b al,0x1
67145 0x23fafe70 30 8fbf4d000000 jz 0x23fafe69 <=0x70>
67146 0x23fafe75 35 8b5d72e22d mov ebx,0x20e8428d ;: object: 0x20e842
67147 0x23fafe7b 3b 305aff cmp [edx+0x1],ebx
67148 0x23fafe7e 3e 8fbf5d000000 jnz 0x23fafe69 <=0x110>
67149 0x23fafe84 44 a081 test al,0x1
67150 0x23fafe86 46 8fbf4d000000 jz 0x23fafe69 <=0x60>
67151 0x23fafe8c 4c 8b5d42e839 mov ebx,0x20e8428d ;: object: 0x20e842
67152 0x23fafe91 51 305aff cmp [eax+0x1],ebx
67153 0x23fafe94 54 8fbf5d000000 jnz 0x23fafe69 <=0x1dd>
67154 0x23fafe9a 5a f20f104e03 movsd xmm1,[ecx+0x3]
67155 0x23fafe9f 5f f20f105003 movsd xmm2,[ecx+0x3]
67156 0x23fafea4 64 c050000000 jnp 0x23fafeff <=0xbdf>
67157 0x23fafea9 69 f20f104e03 movsd xmm1,[ecx+0x3]
67158 0x23fafeae 6e c1f8 sar ebx,1
67159 0x23fafeb0 70 f20f2ad0 cvtsi2sd xmm2,ebx
67160 0x23fafeb4 74 e946000000 jmp 0x23fafeff <=0xbdf>
67161 0x23fafeb9 79 a081 test al,0x1
67162 0x23fafebb 7b 8fbf4d000000 jz 0x23fafe69 <=0x6f>
67163 0x23fafeb1 81 8b5d42e839 mov ebx,0x20e8428d ;: object: 0x20e842
67164 0x23fafeb5 86 305aff cmp [eax+0x1],ebx
67165 0x23fafeb9 89 8fbf5d000000 jnz 0x23fafe69 <=0x1e0>
67166 0x23fafebf 8f c1fa sar ebx,1
67167 0x23fafe01 91 f20f2aca cvtsi2sd xmm1,ebx
67168 0x23fafe05 95 f20f105003 movsd xmm2,[eax+0x3]
67169 0x23fafe0a 9a c020000000 jnp 0x23fafeff <=0xbdf>
67170 0x23fafe0f 9f 00d3 mov ebx,edx
67171 0x23fafe11 a1 03d0 add ebx,ecx
67172 0x23fafe13 a3 8fbf5d000000 jo 0x23fafeff3 <=0xb3>
67173 0x23fafe19 ad b002000000 mov ebx,0x2
67174 0x23fafe1c ac c03c000000 jmp 0x23fafe31 <=0xf1>
67175 0x23fafe1f b3 c1fa sar ebx,1
67176 0x23fafe25 b5 f20f2aca cvtsi2sd xmm1,ebx
67177 0x23fafe29 b9 c1f8 sar ebx,1
67178 0x23fafe2b bb f20f2ad0 cvtsi2sd xmm2,ebx
67179 0x23fafe2f bf c5f358ca vaddsd xmm1,xmm1,xmm2
67180 0x23fafe33 c3 b80e4ef357 mov ebx,0x57f34e08 ;: external referen
67181 0x23fafe38 c8 8d10 mov ebx,[eax]
67182 0x23fafe3a ca 8b5d8c lea ebx,[ecx+0xc]
67183 0x23fafe3d cd 305aff cmp [eax+0x4],ebx
67184 0x23fafe40 d0 8fbf5d000000 jna 0x23fafeff <=0x26f>
67185 0x23fafe46 d6 8018 mov [eax],ebx
67186 0x23fafe48 d8 804201 lea ebx,[ecx+0x1]
67187 0x23fafe4b db 8b5d42e839 mov ebx,0x20e8428d ;: object: 0x20e842
67188 0x23fafe4e e0 305aff mov [eax+0x1],ebx
67189 0x23fafe52 e3 f20f114003 movsd [eax+0x3],xmm1
67190 0x23fafe58 e8 00c3 mov ebx,ecx
67191 0x23fafe5a ea b006000000 mov ebx,0x6
67192 0x23fafe5d ef 00c2 mov ebx,ecx
67193 0x23fafe61 f1 8b44b007 or ebx,[ecx+edi+4+0x7]
67194 0x23fafe65 f5 8944b007 mov [ecx+edi+4+0x7],ecx
67195 0x23fafe6b f9 8b45f0 mov ebx,[ebp+0x10]
67196 0x23fafe6d fc 8b4605 lea ebx,[ecx+0x5]
67197 0x23fafe70 ff 8b45f4 mov ebx,[ebp+0xc]
67198 0x23fafe72 102 8b78f0 mov edi,[ecx+0x10]
67199 0x23fafe75 105 8fbf60439 movzx_b ecx,[ecx+edi+1]
67200 0x23fafe78 109 8b75f8 mov esi,[ebp+0x8]
67201 0x23fafe7c 10c 8b1486 mov ebx,[esi+ecx+4]
67202 0x23fafe7f 10f 8b6d08 mov ebp,[ebp+0x8]
67203 0x23fafe82 112 8b6d08 mov ebx,ebx
67204 0x23fafe84 114 83c430 add esp,0x30
67205 0x23fafe87 117 ffe2 jmp ebx
67206 0x23fafe89 119 8b4dec mov [ebp+0x14],ecx
67207 0x23fafe8c 11c 8b4aff mov ebx,[edx+0x1]
67208 0x23fafe8f 11f 8fbf6f907 movzx_b ecx,[ecx+0x7]
67209 0x23fafe93 123 007d00 mov [ebp+0x10],edi
67210 0x23fafe96 126 01f002000000 cmp ecx,0x02
67211 0x23fafe9c 12c 8fbf4d000000 jz 0x23fafe69 <=0x1b7>
67212 0x23fafe9e 132 01f000000000 cmp ecx,0x00
```

Optimized x86 assembly,
only valid for parameters like
{x: int}

```
cmpq [rax-0x1],rbx
jnz bailout
movl rbx,[rax+0x1b]
addl rbx,0x1
```

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Deoptimize on wrong speculation