Princeton University
COS 217: Introduction to Programming Systems
x86-64 Registers

General Purpose (can use directly in instructions)

<table>
<thead>
<tr>
<th>Bits 63-0</th>
<th>Bits 31-0</th>
<th>Bits 15-0</th>
<th>Bits 15-8</th>
<th>Bits 7-0</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>rax</td>
<td>eax</td>
<td>ax</td>
<td>ah</td>
<td>al</td>
<td>Scratch, return value (caller-saved)</td>
</tr>
<tr>
<td>rbx</td>
<td>ebx</td>
<td>bx</td>
<td>bh</td>
<td>bl</td>
<td>Local variable (callee-saved)</td>
</tr>
<tr>
<td>rcx</td>
<td>ecx</td>
<td>cx</td>
<td>ch</td>
<td>cl</td>
<td>Argument 4 (caller-saved)</td>
</tr>
<tr>
<td>rdx</td>
<td>edx</td>
<td>dx</td>
<td>dh</td>
<td>dl</td>
<td>Argument 3 (caller-saved)</td>
</tr>
<tr>
<td>rsi</td>
<td>esi</td>
<td>si</td>
<td>sil</td>
<td></td>
<td>Argument 2 (caller-saved)</td>
</tr>
<tr>
<td>rdi</td>
<td>edi</td>
<td>di</td>
<td>dil</td>
<td></td>
<td>Argument 1 (caller-saved)</td>
</tr>
<tr>
<td>rbp</td>
<td>ebp</td>
<td>bp</td>
<td>bpl</td>
<td></td>
<td>Local variable (callee-saved)</td>
</tr>
<tr>
<td>rsp</td>
<td>esp</td>
<td>sp</td>
<td>spl</td>
<td></td>
<td>Stack pointer</td>
</tr>
<tr>
<td>r9</td>
<td>r9d</td>
<td>r9w</td>
<td>r9b</td>
<td></td>
<td>Argument 6 (caller-saved)</td>
</tr>
<tr>
<td>r10</td>
<td>r10d</td>
<td>r10w</td>
<td>r10b</td>
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</tr>
<tr>
<td>r11</td>
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<td>r11b</td>
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<td></td>
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