

1. 6

2. $32 - 10 \text{ (global)} - 10 \text{ (local)} = 12 \text{ (6 input + 6 output)}$

a. 6

b. 6

c. Since $298 - 10 \text{ (global)} = 288$ and input and output are shared,
therefore, available register windows = $288 / (6 \text{ (input)} + 10 \text{ (local)}) = 288/16 = 18$

d. $6 \text{ (input)} + 10 \text{ (local)} = 16$

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3. - **SISD (single instruction stream, single data stream)**: executes a single instruction on one data value at a time. Examples: uniprocessors, classic von Neumann machines.
- **SIMD (single instruction stream, multiple data streams)**: executes the same instruction on multiple data values at once. Example: array processors, vector processors, systolic arrays. It can also be used for weather forecasting, medical diagnosing, and image processing.
- **MISD (multiple instruction streams, single data stream)**: executes multiple instructions on one data value simultaneously. Since it is not very useful, there is no practical examples other than the Space Shuttle.
- **MIMD (multiple instruction streams, multiple data streams)**: consists of multi-processors and most current parallel systems.

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4. In VLIW, the processor has several independent execution units. The compiler groups multiple instructions into a single long word, which is presented to the hardware.
In superscalar machines, the processor has several independent execution units as well. The hardware can dispatch multiple instructions in a single cycle. That is, superscalar processors rely on both the hardware and the compiler, while VLIW processor rely entirely on the compiler.

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5. a. Arduin Ivrea.
b. Arduino.
c. That's because of the ease of Arduino and access to the Arduino community with its huge array of software libraries and support that includes an Arduino development environment that helps users create robots or any other sort of electronics project they can dream up. That is, people can make derivatives of Arduino boards or entirely new products powered by Arduino.
d. It was originally developed for design students by creating simple, low cost tools for creating digital projects by non-engineers.
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