DATA HAZARD

Data hazard, it is also known as dependencies. It occurs in computer pipelines. It arises when multiple instructions are executed in different stages of pipelines.

Data hazard can be resolved by forwarding ,stalling ,reordering instruction ,software pipelining techniques.

TYPES:

There are three types of data hazard

(i)Read after write(RAW):

This occurs when instruction tries to read data before a instruction writes it.

(ii)write after read(WAR):

This occurs when instruction write to a register or memory location. It will not

cause a problem in sequential execution, it could lead to incorrect behavior.

(iii)Write after Write(WAW):

This occurs when two instruction attempt to write to the same location in memory.

APPLICATIONS:

There are various application in data hazard :

- *Data forwarding: This techniques allow the processor to forward data directly from output to the input pipeline stage.*
- *Stalling : If hazard is detected the pipelines can be stalled until the hazard is resolved.*
- *Compiler optimization: It can analyze code to rearrange*

instruction to minimize their impact.

- *Pipeline interlocks: It detects the hazard and stall the pipeline when necessary to prevent incorrect execution.*
- *Embedded systems: Data hazards in embedded system are critical. Minimizing hazard can help to control the performance of embedded processor.*

RECENT TRENDS:

(i)Speculative execution

(ii)Advanced pipelining techniques

(iii)Energy efficient hazard handling

(iv)Hazard aware programming models

CONCLUSION:

Data hazards are critical in modern processor device. It arise due to dependencies between instructions. By data hazard processor can improve performance , reliability and energy efficiently.