Problem Solving With C - UE24CS151B

Bit fields in C

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PROBLEM SOLVING WITH C

Bit fields in C

- What is a Bit field?
- Bit field creation
- Few points wrt Bit fields

Bit fields in C

What is a Bit field ?

- The variables defined with a predefined width and can hold more than a single bit
- Consists of a number of adjacent computer memory locations which have been allocated to hold a sequence of bits.
- The meaning of the individual bits within the field is determined by the programmer

- **Great significance in C programming** because of the following reasons
  - Used to reduce memory consumption
  - Easy to implement
  - Provides flexibility to the code

Bit fields in C

Bit field Creation

- **Syntax:** struct [tag] { type [member_name] : width ; };

  type - Determines how a bit-field's value is interpreted. May be int, signed int, or unsigned int

  member_name - The name of the bit-field

  width - Number of bits in the bit-field. The width must be less than or equal to the bit width of the specified type. The largest value that can be stored is 2^n -1, where n is bit-length

- **Example:** struct Status {

  unsigned int bin1:1; // 1 bit is allocated for bin1. only two digits can be stored 0 and 1

  unsigned int bin2:1; // if it is signed int bin1:1 or int bin1:1, one bit is used to represent the sign

  };

- Coding examples

Few points wrt Bit fields

- The first field always starts with the first bit of the word. Cannot overlap integer boundaries
- Cannot extract the address of bit field
- Should be assigned values that are within the range of their size. It is implementation defined to assign an out-of-range value to a bit field member
- Cannot have pointers to bit field members as they may not start at a byte boundary
- Array of bit fields not allowed
- Storage class cannot be used on bit fields
- Can use bit fields in union
- Unnamed bit fields results in forceful alignment of boundary

THANK YOU

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