

Structure, Array using Structure, Bit Field, Union



C Programming

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Structure

- Keyword struct is used to declare user defined data type.
- Is a collection of similar/ dissimilar type of member fields and bit fields.

- **Syntax:**

```
struct <tagname>
{
    <data type> <identifier>;
    .....
    <signed/unsigned> <identifier> : <no.of bits>;
};
```

- Each member/field in structure receives memory separately and in sequence.
- Structure member/field can be accessed outside declaration via structure variable.



Structure

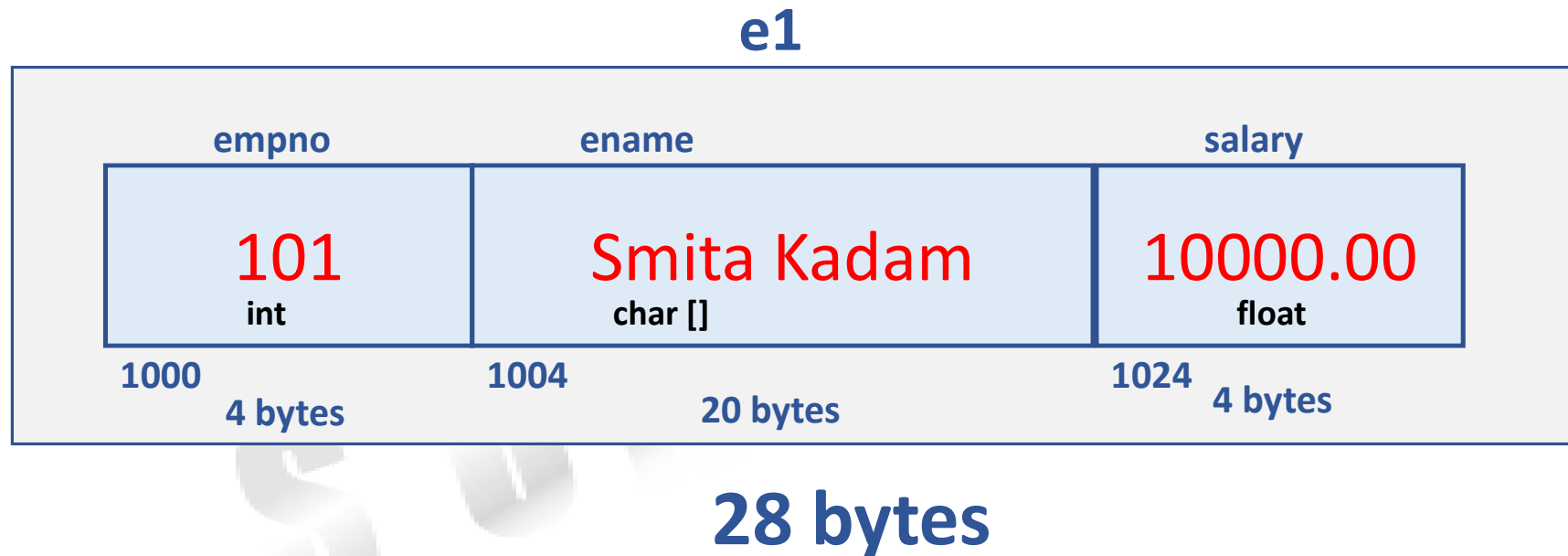
- **Declaration**

```
struct emp
{
    int empno;
    char ename[20];
    float salary;
}e1;    //declares e1 variable of struct emp type
```

- struct emp e2; //declares e2 variable of struct emp type.
- typedef struct emp EMPLOYEE; //helps to give alias to struct emp type.
- EMPLOYEE e3; // declares e3 variable of struct emp / EMPLOYEE type.



Memory Skeleton and How to Access structure members



e1.empno = 101

strcpy(e1.ename,"Smita Kadam");

e1.salary = 10000.00



Nested Structure

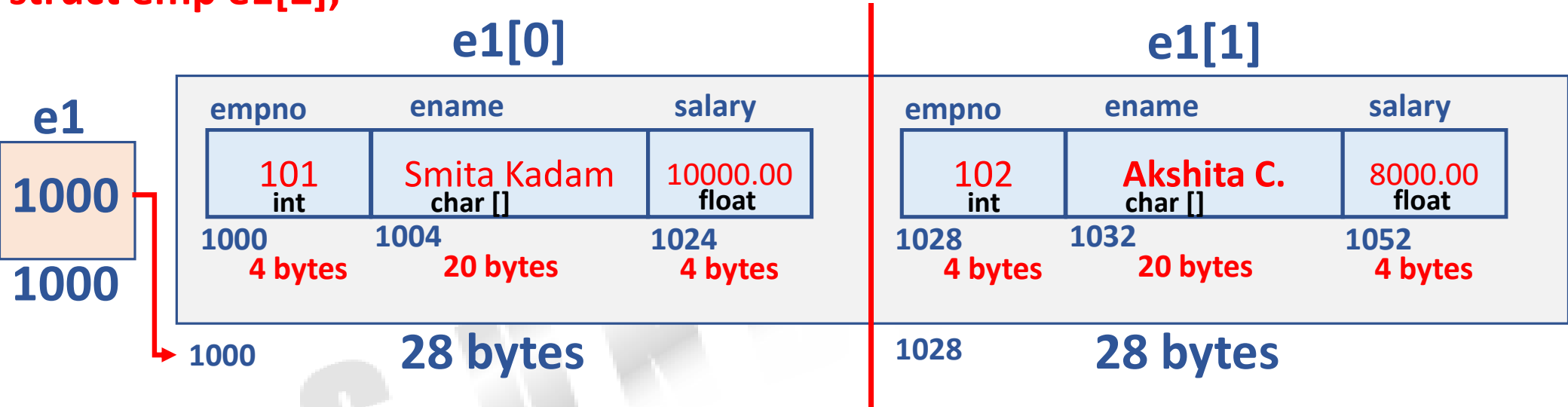
- Declaration

```
struct emp
{
    int empno;
    char ename[20];
    float salary;
    struct date
    {
        int day,month,year;
    }dob;
}e1;
```



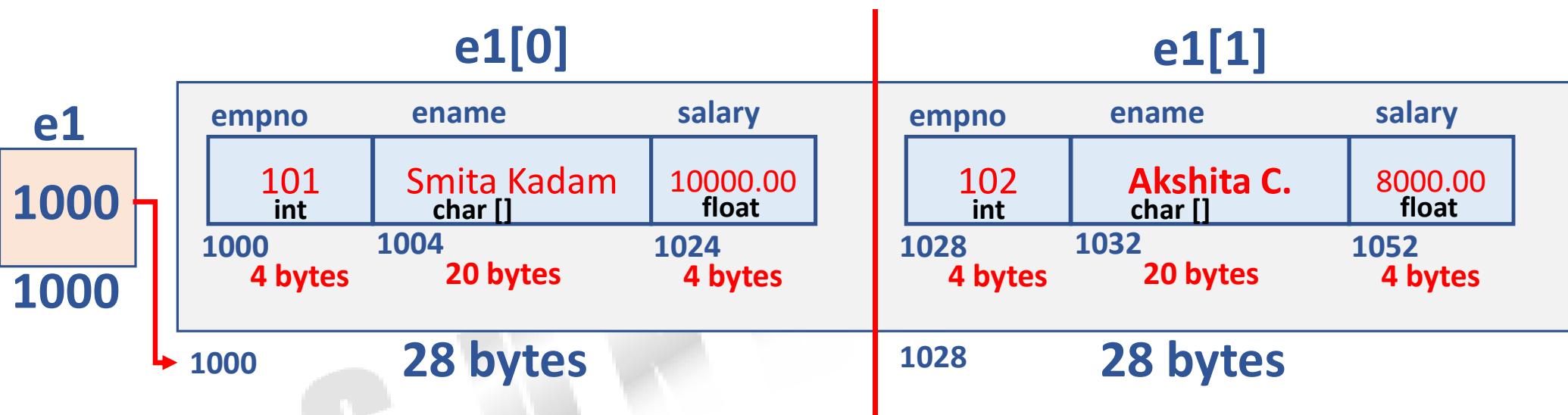
Array using structure

```
struct emp e1[2];
```



```
e1[0].empno = 101  
strcpy(e1[0].ename,"Smita Kadam");  
e1[0].salary = 10000.00
```

Array using pointer



```
struct emp *p = e1;  
(p+0)->empno = 101  
strcpy((p+0)->ename,"Smita Kadam");  
(*p+0).salary = 10000.00
```

Bit Field

- **Syntax**

<signed>/<unsigned> <identifier> : <no. of bits> ;

- Can be declared only within structure.
- Helps to identify bit / bits.
- Can not apply address operator on bit field.
- Should be initialised with value which can fit into specified bits else will result into unpredictable value.



Bit Field Declaration and Memory Allocation

```
#pragma pack(1)
```

```
struct date
```

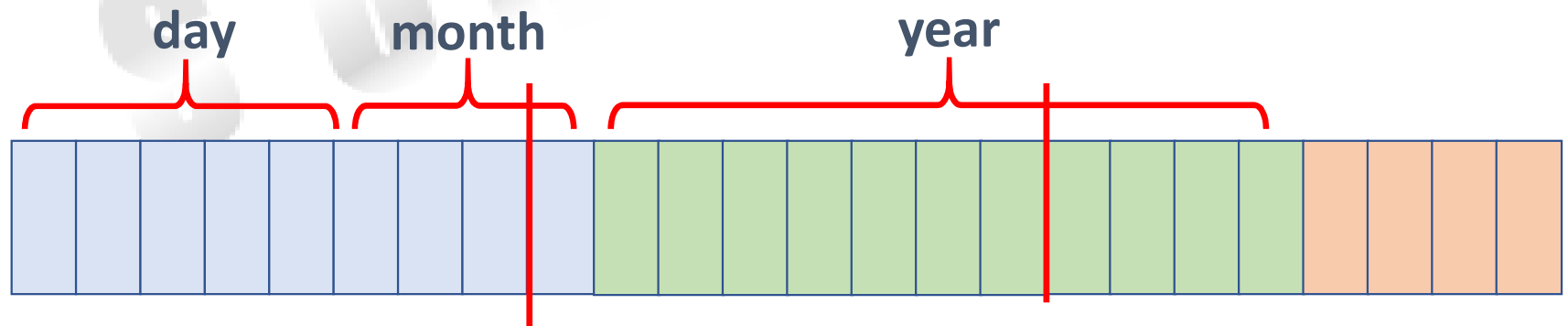
```
{
```

```
    unsigned day : 5;
```

```
    unsigned month : 4;
```

```
    unsigned year : 11;
```

```
};
```



union

- **Points to note:**

- Can be used to declare user data type.
- Can be collection of similar/dissimilar type, bit field collection
- Memory is shared amongst all members.
- Memory is allocated as per the requirement of a member who need highest memory.
- Latest assigned member can be accessed in right manner.



Union memory allocation

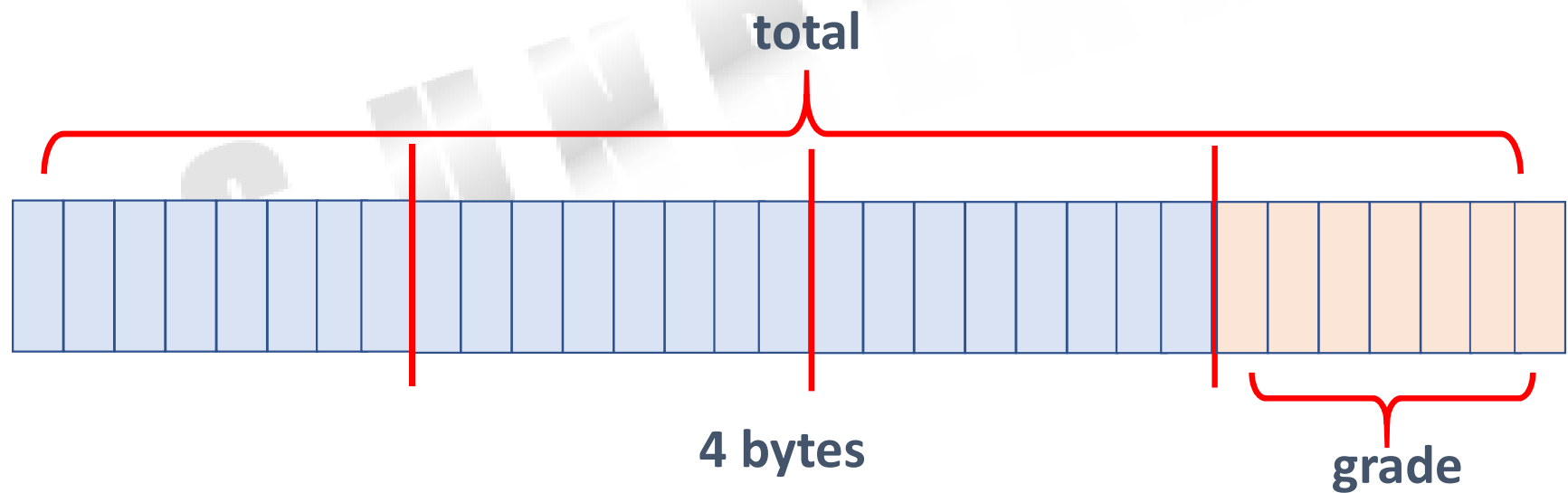
union result

{

char grade;

int total;

}r1;





Thank you!

