

Programming in C

Structure and Union

DPP-01

[NAT]**1.** #include <stdio.h>

```

union u{
    int a;
    char b;
    double d[2];
};
int main()
{
    union u u1;
    printf("%d", (int)sizeof(u1));
    return 0;
}

```

Assume that objects of the type int, char and double occupy 2 bytes, 1 bytes and 4 bytes, respectively.

The memory requirement for variable u1 is _____(in bytes).

[NAT]**2.** Consider the following C declaration:

```

struct
{
    long a[3];
    union
    {
        int y;
        float z;
    }u;
} s;

```

Assume that objects of the type int, float and long occupy 2 bytes, 4 bytes and 8 bytes, respectively.

The memory requirement for variable s is _____(in bytes).

[MCQ]**3.** #include <stdio.h>

```

struct s{
    char a, b;
};
void f(struct s *p){
    p->a+=2;
    p->b-=1;
}
int main()
{
    struct s s1, s2, *q;
    s1.a='A'; s1.b='C';
    q=&s1;
    f(q);
    printf("%c\t%c", s1.a, s1.b);
    return 0;
}

```

The output is:

- (a) C B
- (b) A C
- (c) Compilation error
- (d) Garbage values

[MCQ]**4.** #include <stdio.h>

```

struct s{
    char a, b;
};
void f(struct s s1){
    s1.a+=3;
    s1.b-=1;
}
int main()
{
    struct s s1;
    s1.a='A'; s1.b='C';
    f(s1);
    printf("%c\t%c", s1.a, s1.b);
    return 0;
}

```

The output is:

- (a) C B
- (b) A C
- (c) Compilation error
- (d) Garbage values

[MCQ]

5. #include <stdio.h>
 struct s{
 char a, b;
 };
 void f(struct s s1){
 s1.a+=32;
 s1.b+=32;
 }
 void g(struct s *p){
 static count=2;
 p->a+=count++;
 p->b+=++count;
 }
 int main()
 {
 struct s s1, s2;
 s1.a='A'; s1.b='C';
 s2.a='B'; s2.b='D';
 f(s1);
 for(int i=0;i<2;i++)g(&s2);
 printf("%c\t%c",s1.a, s1.b);
 printf("\t%c\t%c",s2.a, s2.b);
 return 0;
 }

The output is:

- (a) a c B D
- (b) A C B D
- (c) A C H N
- (d) a c B N

[MCQ]

6. #include <stdio.h>
 struct days{
 char *q;
 }s[]={ "Sunday", "Monday", "Tuesday", "Wednesday",
 "Thursday", "Friday", "Saturday"};

```
int main()
{
    struct days *p=s;
    p=p+3;
    printf("%c", *p++>q);
    printf("%c", *++p->q);
    p=p-2;
    printf("%s",p->q);
    return 0;
}
```

The output string printed is-

- (a) WhWednesday
- (b) WTTuesday
- (c) WTWednesday
- (d) WhTuesday

[MSQ]

7. Which of the following statements are INCORRECT?
- (a) Functions cannot be defined inside the structure.
 - (b) Structure variable of the same structure type can be defined inside a structure.
 - (c) A function may not contain a structure defined in it.
 - (d) Existing structure cannot be contained in another structure.

[NAT]

8. #include<stdio.h>
 #include<string.h>
 struct t
 {
 char sname[20];
 };
 int main ()
 {
 struct t t1, t2;
 strcpy(t1.sname, "GATEWallah"); //line a
 t2.sname="GATE2023"; //line b
 printf("%s", t1.sname); //line c
 printf("%s", t2.sname); //line d
 return 0;
 }

The number of lines with error among lines a,b,c,d are _____.

Answer Key

- | | |
|---------|--------------|
| 1. (8) | 5. (c) |
| 2. (28) | 6. (d) |
| 3. (a) | 7. (b, c, d) |
| 4. (b) | 8. (2) |



Hints and Solutions

1. (8)

The size of the union is equal to the maximum size of the member variables

Here, double d[2] has the maximum size

\therefore size of union = (2×4) bytes = 8 bytes

2. (28)

The size of the structure variable is the sum of the sizes of all its member variables

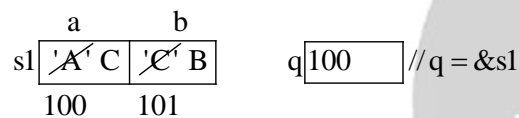
Size of structure = size of long a[3] + size of union

$$= 8 \times 3 + \max(4, 4)$$

$$= 24 + 4$$

$$= 28$$

3. (a)



f(100)

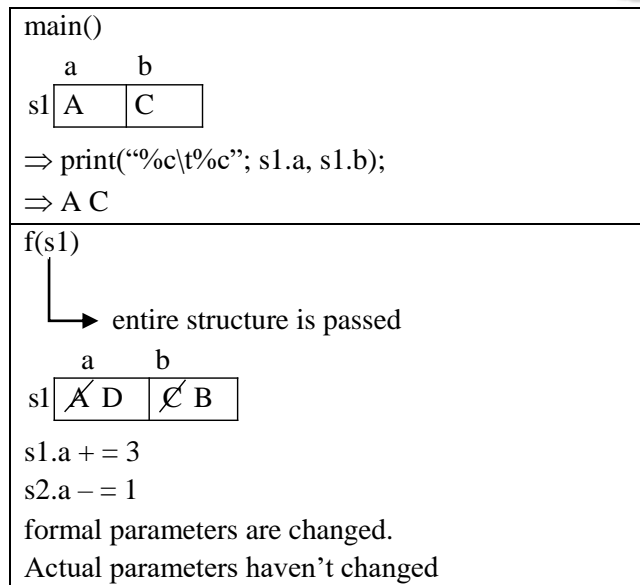
p[100]

100 \rightarrow a + = 2; // 100 \rightarrow a = 'C'

100 \rightarrow b - = 1; // 100 \rightarrow b = 'B'

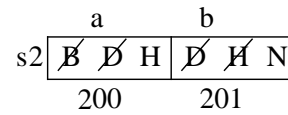
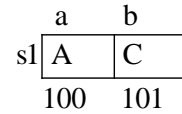
\therefore printf() prints 'C B';

4. (b)



\therefore Output: A C

5. (c)



g(&s2); g(&s2);

f(s1)

entire structure is passed.

\Rightarrow It will change the formal parameters but the actual parameters in main() won't change

g(200)

count ~~2~~ ~~3~~ 4

static

200 \rightarrow a + = 2; // D

200 \rightarrow b + = 4; // H

g(200)

count ~~4~~ ~~5~~ 6

200 \rightarrow a + = 4; // H

200 \rightarrow b + = 6; // N

\therefore Output-

printf("%c\t%c", s1.a, s1.b);

printf("%c\t%c", s2.a, s2.b);

\Rightarrow A C H N

6. (d)

100 101 102 103 104 105 106

S	u	n	d	a	y	\0
---	---	---	---	---	---	----

200 201 202 203 204 205 206

M	o	n	d	a	y	\0
---	---	---	---	---	---	----

300 301 302 303 304 305 306 307

T	u	e	s	d	a	y	\0
---	---	---	---	---	---	---	----

400 401 402 403 404 405 406 407 409 410

W	e	d	n	e	s	d	a	y	\0
---	---	---	---	---	---	---	---	---	----

500 501 502 503 504 505 506 507 508

T	h	u	r	s	d	a	y	\0
---	---	---	---	---	---	---	---	----

600 601 602 603 604 605 606

F	r	i	d	a	y	\0
---	---	---	---	---	---	----

700 701 702 703 704 705 706 707 708

S	a	t	u	r	d	a	y	\0
---	---	---	---	---	---	---	---	----

s	100	200	300	400	500	600	700
---	-----	-----	-----	-----	-----	-----	-----

↑

array of structures

p | ~~800~~ ~~812~~ ~~816~~ 808

printf("%c", *p++ → q);

*812 → 400 ⇒ w

printf("%c", *++p → q);

*++812 → 500 ⇒ *++500

⇒ *++501

⇒ h

p=p-2;//p=808

printf("%s", p → q);

808 → 300 ⇒ Tuesday

∴ Output: WhTuesday

7. (b, c, d)

(a) CORRECT. Functions cannot be defined inside the structure

(b) INCORRECT. Structure variable of the same structure type cannot be defined inside structure.

(c) INCORRECT. A function can contain a structure defined in it.

(d) INCORRECT. Existing structure can be contained in another structure

8. (2)

line b: ERROR. Constant base address cannot be changed

line d: ERROR. As line 2 has error, line 4 cannot be executed.

Any issue with DPP, please report by clicking here:- <https://forms.gle/t2SzQVvQcs638c4r5>For more questions, kindly visit the library section: Link for web: <https://smart.link/sdfez8ejd80if>PW Mobile APP: <https://smart.link/7wwosivoicgd4>