Department of Computer Science & Engineering
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Practice Sheet #07 with Solutions

Topic: Pointer in C

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1- Assume the following C variable declaration

int *A [10], B[10][10];

Of the following expressions I A[2] II A[2][3] III B[1] IV B[2][3] which will not give compile-time errors if used as left hand sides of assignment statements in a C program?

A. I, II, and IV only

B. II, III, and IV only

C. II and IV only

D. IV only

2- The following program fragment is written in a programming language that allows variables and does not allow nested declarations of functions.

```
global int i = 100, j = 5;
void P(x)
{
   int i = 10;
   print(x + 10);
   i = 200;
   j = 20;
   print(x);
}
main()
{
   P(i + j);
}
```

If the programming language uses static scoping and call by need parameter passing mechanism, the values printed by the above program are

A. 115, 220

B. 25, 220

C. 25, 15

D. 115, 105

3- The following program fragment is written in a programming language that allows variables and does not allow nested declarations of functions.

```
global int i = 100, j = 5;
void P(x)
{
   int i = 10;
   print(x + 10);
   i = 200;
   j = 20;
   print(x);
}
main()
{
   P(i + j);
}
```

If the programming language uses dynamic scoping and call by name parameter passing mechanism, the values printed by the above program are :

A. 115, 220

B. 25, 220

C. 25, 15

D. 115, 105

4- Consider the C program shown below.

```
#include <stdio.h>
#define print(x) printf("%d ", x)
int x;
void Q(int z)
{
   z += x;
   print(z);
}
void P(int *y)
{
   int x = *y + 2;
   Q(x);
   *y = x - 1;
   print(x);
```

```
}
main(void)
{
   x = 5;
   P(&x);
   print(x);
}
```

The output of this program is

A. 12 7 6

B. 22 12 11

C. 14 6 6

D. 7 6 6

5- What does the following C-statement declare?

```
int ( * f) (int * ) ;
```

A. A function that takes an integer pointer as argument and returns an integer.

B. A function that takes an integer as argument and returns an integer pointer.

C. A pointer to a function that takes an integer pointer as argument and returns an integer.

D. A function that takes an integer pointer as argument and returns a function pointer

6- Consider this C code to swap two integers and these five statements after it:

```
void swap(int *px, int *py)
{
  *px = *px - *py;
  *py = *px + *py;
  *px = *py - *px;
}
```

S1: will generate a compilation error S2: may generate a segmentation fault at runtime depending on the arguments passed S3: correctly implements the swap procedure for all input pointers referring to integers stored in memory locations accessible to the process S4: implements the swap procedure correctly for some but not all valid input pointers S5: may add or subtract integers and pointers.

A. S1

B. S2 and S3

C. S2 and S4

D. S2 and S5

7- What is printed by the following C program?

```
include <stdio.h>
int f(int x, int *py, int **ppz)
{
  int y, z;
  **ppz += 1;
   z  = **ppz;
  *py += 2;
   y = *py;
   x += 3;
   return x + y + z;
}

void main()
{
   int c, *b, **a;
   c = 4;
   b = &c;
   a = &b;
   printf( "%d", f(c,b,a));
   getchar();
}
```

A. 18

B. 19

C. 21

D. 22

8- Output of following program?

```
#include <stdio.h>
int fun(int n, int *f_p)
{
    int t, f;
    if (n <= 1)
    {
        *f_p = 1;
        return 1;
    }
    t = fun(n- 1,f_p);
```

```
    f = t+ * f_p;
    *f_p = t;
    return f;
}

int main()
{
    int x = 15;
    printf (" %d \n", fun(5, &x));
    return 0;
}
```

A. 6

B. 8

C. 14

D. 15

9- What does the following program print?

```
#include
void f(int *p, int *q)
{
  p = q;
 *p = 2;
}
int i = 0, j = 1;
int main()
{
  f(&i, &j);
  printf("%d %d \n", i, j);
  getchar();
  return 0;
}
```

A. 2 2

B. 2 1

C. 0 1

D. 0 2

10- #include<stdio.h>

```
int f(int *a, int n)
{
  if(n <= 0) return 0;
```

```
  else if(*a % 2 == 0) return *a + f(a+1, n-1);
  else return *a - f(a+1, n-1);
}

int main()
{
  int a[] = {12, 7, 13, 4, 11, 6};
  printf("%d", f(a, 6));
  getchar();
  return 0;
}
```

A. -9

B. 5

C. 15

D. 19

11- What is the return value of f(p,p), if the value of p is initialized to 5 before the call? Note that the first parameter is passed by reference, whereas the second parameter is passed by value.

```
int f(int &x, int c) {
   c = c - 1;
   if (c==0) return 1;
   x = x + 1;
   return f(x,c) * x;
}
```

A. 3024

B. 6561

C. 55440

D. 161051

12- The output of the following C program is _____.

```
void f1 (int a, int b)
{
  int c;
  c=a; a=b; b=c;
}
void f2 (int *a, int *b)
```

```
{
 int c;
 c=*a; *a=*b;*b=c;
}
int main()
{
 int a=4, b=5, c=6;
 f1(a, b);
 f2(&b, &c);
 printf ("%d", c-a-b);
 return 0;
}
```

A. **-5**

B. -4

C. 5

D. 3

13- What is the output of the following C code? Assume that the address of x is 2000 (in decimal) and an integer requires four bytes of memory.

```
#include <stdio.h>

int main()

{

  unsigned int x[4][3] = {{1, 2, 3}, {4, 5, 6},

                          {7, 8, 9}, {10, 11, 12}};

  printf("%u, %u, %u", x+3, *(x+3), *(x+2)+3);

}
```

A. 2036, 2036, 2036

B. 2012, 4, 2204

C. 2036, 10, 10

D. 2012, 4, 6

14- Consider the following function written in the C programming language. The output of the above function on input "ABCD EFGH" is

```
void foo (char *a)
{
 if (*a && *a != ` `)
```

```
  {
    foo(a+1);
    putchar(*a);
  }
}
```

A. ABCD EFGH

B. ABCD

C. HGFE DCBA

D. DCBA

15- Consider the following C program segment.

```
# include <stdio.h>
int main( )
{
   char s1[7] = "1234", *p;
   p = s1 + 2;
   *p = '\0' ;
   printf ("%s", s1);
}
```

What will be printed by the program?

A. 12

B. 120400

C. 1204

D. 1034

16- Consider the following C program.

```
# include <stdio.h>
int main( )
{
  static int a[] = {10, 20, 30, 40, 50};
  static int *p[] = {a, a+3, a+4, a+1, a+2};
  int **ptr = p;
  ptr++;
  printf("%d%d", prt-p, **ptr};
}
```

The output of the program is _____

A. 140

B. 120

C. 100

D. 40

17- Predict the output of the program

```
int main()
{
char *ptr = "IITKharagpur";
printf("%c\n", *&*&*ptr);

getchar();
return 0;
}
```

A- I
B- II
C- IIT
D- IITK

18- Predict the output of the below code

```
#include<stdio.h>

int *fun()
{

        int x = 5;

        return &x;
}


int main()
{
        int *p = fun();
        fflush(stdin);
        printf("%d", *p);
        return 0;
}
```

A- A garbage Address
B- 5
C- Error at int *p= fun();
D- Error at printf(“%d”,*p);

19- Predict the output of the below code

```
#include<stdio.h>

int *fun()
{
```

```
        static int x = 5;
        return &x;
}

int main()
{
        int *p = fun();
        fflush(stdin);
        printf("%d",*p);
}
```

A- A Garbage Address
B- 5
C- Error at int *p=fun();
D- Error at printf("%d",*p);

20- Predict the output of the below code

```
#include<stdlib.h>

int main()
{
        int x = 4;
        float y = 5.5;
        void *ptr;
        ptr = &x;
        printf("Integer variable is = %d", *( (int*) ptr) );
        ptr = &y;
        printf("\nFloat variable is= %f", *( (float*) ptr) );
        return 0;
}
```

A- Integer variable is = 4
Float variable is= 5.500000
B- Integer variable is = 5
Float variable is= 4.000000
C- Integer variable is = 4
Float variable is= 5.000000
D- Integer variable is = 5
Float variable is= 5.500000

21- Predict the output of the below code

```
#include <stdio.h>
int main()
{
        int *ptr = NULL;
        printf("The value of ptr is %u", ptr);
        return 0;
}
```

A- The value of ptr is 0

B- The value of ptr is 1
C- Error at printf statement
D- The value of ptr is a garbage value

22- Predict the output of the below code

```
#include<stdio.h>
int main()
{
        int a = 10;
        void *ptr = &a;
        printf("%d", *ptr);
        return 0;
}
```

A- 10
B- Compile time error
C- A garbage value
D- Print 10 in binary format

23- Predict the output of the below code

```
#include<stdio.h>
int main()
{
        int a = 10;
        void *ptr = &a;
        printf("%d", *(int *)ptr);
        return 0;
}
```

A- 10
B- Compile time error
C- A garbage value
D- Print 10 in Binary format

24- Predict the output of the below code

```
 #include<stdio.h>
int main()
{
        int a[2] = {1, 2};
        void *ptr = &a;
        ptr = ptr + sizeof(int);
        printf("%d", *(int *)ptr);
        return 0;
}
```

A- 2
B- 3
C- 1
D- A garbage value

25- Predict the output of the below code

```
#include <stdio.h>
int main()
{
int *i, *j;
int *ii = NULL, *jj = NULL;
if(i == j)
{
printf("This might get printed if both i and j are same by chance.");
}
if(ii == jj)
{
printf("This is always printed coz ii and jj are same.");
}
return 0;
}
```

A- This is always printed coz ii and jj are same.
B- This might get printed if both i and j are same by chance.
C- Error at assignments of ii and jj
D- Error at if(i==j)

26- Predict the output of the below code

```
#include <stdio.h>

void fun1() { printf("Fun1\n"); }
void fun2() { printf("Fun2\n"); }


void wrapper(void (*fun)())
{
        fun();
}

int main()
{
        wrapper(fun1);
        wrapper(fun2);
        return 0;
}
```

A- Fun1
Fun2
B- Fun2
Fun1
C- Fun1
Fun1
D- Fun2

Fun2