

1. What does the following program print?

```
#include <stdio.h>

int main( void )
{
    int data[3][3] = { {13, 22, 31},
                       {14, 15, 16},
                       {17, 18, 19} };

    int i, k, temp;
    int* ptrA = &data[0][0];
    int* ptrZ = &data[2][0];

    for(k = 0; k < 3; k++)
    {
        temp = *ptrA;
        *ptrA = *ptrZ;
        *ptrZ = temp;

        ptrA++;
        ++ptrZ;
    }

    for(i = 0; i < 3; i++)
    {
        for(k = 0; k < 3; k++)
            printf("%3d", data[i][k]);

        printf("\n");
    }
}
```

2. What does the following program print?

```
#include <stdio.h>

void add(int [], int []);

int main( void )
{
    int data[] = {8, 8, 13, 8};
    int value[] = {4, 5, 6, 7};

    add(data, value);
}

void add(int a[], int b[])
{
    int count = 0;

    do
    {
        if( ( a[count] + b[count] ) % 3 == 0 )
            b[count] = a[count];

        count++;
    }
    while(count < 4);

    printf("%d, %d, %d, %d\n", a[0], a[1], b[2], b[3]);
}
```

3. What does the following program print?

```
#include <stdio.h>

int main( void )
{
    int data[3][3] = { {11, 12, 13},
                      {14, 15, 16},
                      {17, 18, 19} };

    int i, j;

    for (i = 0; i < 3; i++)
    {
        for(j = 0; j < 3; j++)
        {
            if( data[i][j] != data[0][j] )
                data[i][j] = data[0][j];
        }
    }

    for (j = 0; j < 3; j++)
        printf("%d, ", data[1][j]);
}
```

4. What does the following program print?

```
#include <stdio.h>

int main( void )
{
    int data[] = {15, 16, 17, 20, 19};
    int *ptr = data;
    int i;

    for(i = 0; i < 2; i++)
        ++ptr;

    printf("*ptr is %d\n", *ptr);
}
```

5. What does the following program print?

```
#include <stdio.h>

void fc(int [], int*);

int main( void )
{
    int data[] = {1, 2, 3, 4, 5, 6};
    int answer;

    fc(data, &answer);

    printf("answer is %d", answer );
}

void fc(int a[], int* out)
{
    int i;
    *out = 0;

    for(i = 0; i < 3; i++)
        *out += a[i] + a[5 - i];
}
```

6. What does the following program print?

```
#include <stdio.h>

int main( void )
{
    int values[] = {12, 39, 14, 99, 76};

    int i;

    for(i = 0; i < 5; i++)
        printf("%3d", *values);
}
```

7. What does the following program print?

```
#include <stdio.h>

void fc(int*, int*);

int main( void )
{
    int a = 50;
    int b = 24;

    fc(&a, &b);

    printf("a = %d, b = %d\n", a, b);
}

void fc(int* x, int* y)
{
    if(*x && *y)
        if(*x <= 50)
            *y = 35;
}
```

8. What does the following program print?

```
#include <stdio.h>

int main( void )
{
    int data[] = {10, 20, 30, 40, 50};
    int counter = 1;

    while(counter <= 5)
    {
        *data += 1;
        counter++;
    }

    printf("%d, %d", data[0], data[4]);
}
```

9. What does the following program print?

```
#include <stdio.h>

int main( void )
{
    int count = 1;
    int length = 18; /* this should be 17 */

        /* this had a typo since the 9 was left out */
        /* 01234567890123456 */
    char text[] = "tirty waograkish";

    if(length%4 == 0)
        count = 0;

    while(count < length)
    {
        printf("%c", text[count]);
        count += 2;
    }
}
```

10. What does the following program print?

```
#include <stdio.h>

int main( void )
{
        /* 0123456789012345678 */
    char text[] = "arzedaddj pt hbitsq";
    char* ptr = text;

    ptr++;

    while(*ptr != '\0')
    {
        printf("%c", *ptr);
        ptr += 2;
    }
}
```

11. What does the following program print?

```
#include <stdio.h>

int main( void )
{
    double a = 6.4;
    double b = 5.7;

    double *ptrA = &a;
    double *ptrB = &b;

    if (a > *ptrA)
    {
        *ptrA = 1.1;
        *ptrB = 2.2;
    }
    else if(b < *ptrB)
        a = 9.9;

    printf("a is %3.1f, b is %3.1f\n", a, b);
}
```

12. What does the following program print?

```
#include <stdio.h>

int main( void )
{
    int data[] = {13, 14, 15, 16, 17, 18, 19, 20};
    int* ptr = &data[0];
    int count = 3;

    while(count > -2)
    {
        printf("%d\n", *ptr);
        ptr = ptr + count;
        count--;
    }
}
```

13. What does the following program print?

```
#include <stdio.h>

int main( void )
{
    int a = 50;
    int z = 50;

    int* ptrA = &a;
    int* ptrZ = &z;

    if(ptrA == ptrZ)
    {
        a = 100;
        z = 100;
    }

    printf("a is %d, z is %d\n", a, z);
}
```

14. What does the following program print?

```
#include <stdio.h>

int main( void )
{
    /* 01234567890 */
    char letters[] = "nhfssi iut";
    char temp, i;

    for(i = 0; i <= 5; i += 2)
    {
        temp = letters[10 - i];
        letters[10 - i] = letters[i];
        letters[i] = temp;
    }

    printf("%s", letters);
}
```

15. What does the following program print?

```
#include <stdio.h>

int main( void )
{
    int data[][4] = { {1, 2, 3, 4},
                      {5, 6, 7, 8},
                      {9, 10, 11, 12} };

    int r, c;

    for(r = 0; r < 3; r++)
        for(c = 0; c < 4; c++)
            if(r == c)
                printf("%3d", (*(data + r) + c) + 10 );
}
```

16. What does the following program print?

```
#include <stdio.h>

int main( void )
{
    int data [] [3] = { {15, 18, 21},
                       {24, 27, 30} };
    int* ptr = &data[0][0];
    int i;

    for(i = 0; i < 4; i++)
    {
        ptr++;
        printf("%3d", *ptr);
    }
}
```