



4. Given the following program segment. Assume that all variables are of type int.

```

z = 0;
g = 0;
s = 0;
i = 0;
while (i < 50) {
    scanf("%d", &t);
    s = s + t;
    if (t >= 0)
        g = g + 1;
    else
        z = z + 1;
    i = i + 1;
}

```

The value stored in variable s at the end of the execution of the loop could best be described as \_\_\_\_\_.

- a) the average of the numbers scanned  
b) the sum of the numbers scanned  
c) how many numbers were scanned  
d) the largest of the numbers scanned
5. Which one of the following expressions does not evaluate to 3?
- a)  $2 + 16 \% 5$   
b)  $7 - 15 / 4$   
c)  $6 * 5 / 10$   
d)  $2 - 4 * 3 + 26 / 2$
6. The expression  $x *= i + j / y;$  is equivalent to \_\_\_\_\_.
- a)  $x = x * i + j / y;$   
b)  $x = (x * i) + j / y;$   
c)  $x = (x * i + j) / y;$   
d)  $x = x * (i + j / y);$
7. What is the output of the segment below?
- ```

int a;
a=3;
switch(a) {
    case 2: printf("i"); break;
    case 3: printf("ii"); break;
    default: printf("iii");
}

```
- a) i  
b) ii  
c) iii  
d) iiii
8. For what exact range of values of variable x does the following code segment display the letter 'C'?
- ```

if (x <= 200)
    if (x < 100)
        if (x <= 0)
            printf("A\n");
        else
            printf("B\n");
    else
        printf("C\n");
else
    printf("D\n");

```
- a)  $0 < x < 100$   
b)  $x <= 0$   
c)  $100 <= x <= 200$   
d)  $100 < x <= 200$

9. If the input to the program segment at the right is 85, what is its output?

```
scanf("%d", &s);
if (s >= 90)
    printf("A\n");
else if (s >= 70)
    printf("C\n");
else if (s >= 80)
    printf("B\n");
else
    printf("D\n");
```

- a) A
- b) B
- c) C
- d) D

10. How many lines of output will be displayed by the following program fragment?

```
for (i = 0; i < 5; i = i + 1)
    for (j = 0; j < i; j = j + 1)
        printf("%d %d\n", i, j);
```

- a) 20
- b) 10
- c) 9
- d) 5

**Part II: Tracing** (15 pts. 5 pts. each)

11. What is the output of the program below:

```
for (k = 5; k > 0; k = k - 1) {
    for (i = 1; i <= 5 - k; i = i + 1)
        printf(".");
    for (j = 1; j <= 2 * k - 1; j = j + 1)
        printf("B");
    printf("\n");
}
```

**Answer:** (Write one character per box)


12. What is displayed by the following code fragment if all the variables are of type int?

```
k = 0;
m = 0;
for (p = 0; p < 10; p = p + k) {
    k = k + 1;
    m = m + p;
    printf("%4d%4d%4d\n", p, k, m);
}
```

**Answer:** (Write one character per box)


13. What is the final output of the following program segment ?

```
double k = 35.0 ;
printf ( " % f * " , k ++ / 2.0) ;
printf ( " % d " , int (k) ) ;
```

**Answer:**

**Part III: Programming** (35 pts. 12 pts. each)

14. Write a do-while loop that repeatedly scans integer values until a positive even number is input. You may assume the input data is a list of integers separated by blanks, and that there is a positive even number in the list.

**Answer:**

15. The decision table below shows fines imposed for speeding violations. Write a code segment that assigns the correct fine to type double variable fine based on the value of type *int* variable speed. Use *if-else* statement(s).

Speed (mph)	Fine (\$)
65 or less	0
66-70	15.00
71-75	30.00
76-80	75.00
over 80	100.00

**Answer:**

16. Complete the program below so that it computes the price of a piece of glass. Pieces of glass are usually priced based on the type of glass and the area of the piece, but there is a minimum charge of \$2.00. For clear glass (glass type 1), the charge is \$6.00 per square meter; for frosted glass (type 2), the price is \$10.00 per square meter. For example, the cost of a 0.25-square-meter piece of clear glass is \$2.00 since  $0.25 * \$6.00$  is \$1.50, an amount less than the minimum charge. The price of a 2.4-square-meter piece of frosted glass is \$24.00 ( $2.4 * \$10.00$ ). You do not need to do error checking in the program. Use *if-else* statement(s).

```
#include <stdio.h>

#define CLEAR          1
#define SQMETER_CLEAR 6.00

#define FROSTED       2
#define SQMETER_FROSTED 10.00

#define MINIMUM       2.00

int
main(void)
{
    double price, area;
    int    type;
    printf("Enter glass type: %d (clear) or %d (frosted)> ",
           CLEAR, FROSTED);
    scanf("%d", &type);
    printf("Enter area in square meters> ");
    scanf("%lf", &area);
    .
    .
    .
    printf("Glass price is $%.2f\n", price);
    return (0);
}
```

**Answer:**