

Name and SSN:

KEY

Instructor's Name:

Andrew Charles Breiner

Question	Points	Score
1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
7	10	
8	10	
9	10	
10	10	
Total:	100	

1. (10 points) What is displayed by this program fragment for an input of 10? (Question (2) of Self-Check on page 215 in section 5.2)

```
scanf("%d", &n);
ev = 0;
while (ev < n) {
    printf("%3d", ev);
    ev = ev + 2;
}
printf("\n");
```

Solution:

0
2
4
6
8

2. (10 points) Where possible, write equivalents for the following statements using compound assignment operators. (Question (4) of Self-Check on page 222 in section 5.3)

Solution:

<code>r = r / 10;</code>	<code>r /= 10;</code>
<code>z = z * x + 1;</code>	not possible
<code>q = q + r * m;</code>	<code>q += r * m;</code>
<code>m = m - (n + p);</code>	<code>m -= (n + p)</code>

3. (10 points) What values are assigned to **n**, **m**, and **p**, given these initial value? (Hint the value of i and j will change with each assignment.) (Question (4) of Self-Check on page 230 in section 5.4)

i = 3 and **j = 9**

Solution:

<code>n = ++i * -j;</code> (this is a minus minus in front of j)	32.0
<code>m = i + j-;</code> (this is a minus minus behind the j)	12.0
<code>p = i + j;</code>	11.0

4. (10 points) Show the output displayed by these nested loops: (Question (2) of Self-Check on page 249 in section 5.7)

```
for (i = 0; i < 2; ++i) {
    printf("Outer %4d\n", i);
    for (j = 0; j < 3; ++j) {
        printf("    Inner%3d%3d\n", i, j);
    }
    for (k = 2; k > 0; --k) {
        printf("    Inner%3d%3d\n", i, k);
    }
}
```

Solution:

```
Outer 0
  Inner 0 0
  Inner 0 1
  Inner 0 2
  Inner 0 2
  Inner 0 1
Outer 1
  Inner 1 0
  Inner 1 1
  Inner 1 2
  Inner 1 2
  Inner 1 1
```

5. (10 points) Rewrite the program segment that follows, using a for loop: (Question (5) of Review Questions on page 272)

```
count = 0;
i = 0;
while (i < n) {
    scanf("%d", &x);
    if (x == i)
        ++count;
    ++i;
}
```

Solution:

```
count = 0;
for (i = 0; i < n; ++i) {
    scanf("%d", &x);
    if (x == i)
        ++count;
}
```

6. (10 points) Write a program fragment that produces this output: (Question (1) of Programming on page 216 in section 5.2)

```
0   1
1   2
2   4
3   8
4  16
5  32
6  64
```

Solution:

```
n = 0
while ( n < 7) {
    printf("%d %3d",n,pow(2,n));
    n++;
}
```

7. (10 points) Write a program segment that computes $1 + 2 + 3 + \dots + (n - 1) + n$, where n is a data value. Follow the loop body with an if statement that compares this value to $(n * (n + 1)) / 2$ and displays a message that indicates whether the values are the same or different. What message do you think will be displayed? (Question (1) of Programming on page 222 in section 5.3)

Solution:

```
lcv = 1;
sum = 0;
while (lcv <= n) {
    sum += lcv;
    lcv++;
}
if (sum == ((n*(n+1))/2)) {
    printf("Equal\n");
}
else {
    printf("Not Equal\n");
}
```

The are the same

8. (10 points) Write a program to display an inches-to-centimeters conversion table. The smallest and largest number of inches in the table are input values. Your table should give conversions in 6-inch intervals. One inch equals 2.54 cm. (Question (2) of Programming on page 231 in section 5.4)

Solution:

```
#include <stdio.h>
#define INCH_PER_CM 2.54

int main(void) {
    double smallest, largest, in, cm;

    printf("What is the smallest and largest inch value? ");
    scanf("%lf %lf", &smallest, &largest);

    for (in = smallest; in <= largest; in += 6) {
        cm = 2.54 * in;
        printf("%10.2f in = %10.2f cm\n", in, cm);
    } //for

    return 0;
} //main
```

9. (10 points) There are 9,870 people in a town whose population increases by 10 percent each year. Write a loop that displays the annual population and determines how many year (**count_year**) it will take for the population to surpass 30,000. (Question (1) of Programming on page 237 in section 5.5)

Solution:

```
#include <stdio.h>

int main(void) {
    int count_year = 0;
    double pop = 9870.0;

    while (pop < 30000) {
        printf("Population is %5.0f\n", pop);
        pop = pop*.1 + pop;
        count_year++;
    } //while
    printf("It will take %d years.\n", count_year);

    return 0;
} //main
```

10. (10 points) Write a program that displays the multiplication table for numbers 0 to 9. (Hint: It should be set up in a table so you should have 10 columns and 10 rows) (Question (1) of Programming on page 249 in section 5.7)

Solution:

```
#include <stdio.h>

int main(void) {
    int i, j;

    for (i = 0; i <= 9; i++) {
        for (j = 0; j <= 9; j++) {
            printf("%5d", (i*j));
        } //for
        printf("\n");
    } //for

    return 0;
} //main
```