

NAME Solutions Comp name \_\_\_\_\_

1. (20%) Write a function to compute  $\sum_{k=1}^n \frac{1}{k} = \frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{n}$ .

```
double summation(int n)
{
    double sum = 0;
    int k;
    for (k=1; k<=n; k++)
        sum = sum + 1.0/k;
    return sum;
}
```



3. (20%) For each of the following code segments indicate what is the output. Assume the following declarations: `int w = 0, x = 10, y = 20, z = 30;`

a. `if (w == 0 && x * 2 > 20)`  
`printf("True");`  
`else`  
`printf("False");` ✓

False

b. `if (x == y - x && (w * z > 10 || y < 25))`  
`printf("True");` ✓

True

c. `if (k <= 15 && k > 15)`  
`printf("False");`  
`else`  
`printf("True");` ✓

True

f. `if (x <= 10 && y > 10)`  
`if (z == 20 || z != 30)`  
`printf("Hi");`  
`else`  
`printf("Hello");` ✓

Hello

g. `if (x = 20)`  
`if (x > 15)`  
`printf("Hi");` ✓

Hi

4. (22%) What is the output of the following program?

```
int x = 1, y = 2, z = 3;
```

```
int bill(int x, int *k1)
```

```
{
  int z = 50;
```

```
  z = z + x;  $50 + 3 = 53$ 
```

```
  z = z + y;  $53 + 2 = 55$ 
```

```
  z = z + *k1;  $55 + 20 = 75$ 
```

```
  *k1 = *k1 + 1;  $20 + 1 = 21$ 
```

```
  y = y + 10;  $2 + 10 = 12$ 
```

```
  x = x + 20;  $3 + 20 = 23$ 
```

```
  z = z + 30;  $75 + 30 = 105$ 
```

```
  return z;
```

```
}
```

```
void main()
```

```
{
  int a = 10; b = 20; c = 30, x = 40;
```

```
  c = bill(z, &b);  $c = 105$ 
```

```
  printf("x = %d, y = %d, z = %d, a = %d, b = %d, c = %d, \n", x, y, z, a, b, c);
```

```
}
```

Output

| file |    |   | main |    |     |    | Bill |     |  |
|------|----|---|------|----|-----|----|------|-----|--|
| x    | y  | z | a    | b  | c   | x  | *k1  | z   |  |
| 1    | 2  | 3 | 10   | 20 | 30  | 3  | 20   | 50  |  |
|      | 12 |   |      | 21 | 105 | 23 | &b   | 53  |  |
|      |    |   |      |    |     |    |      | 55  |  |
|      |    |   |      |    |     |    |      | 75  |  |
|      |    |   |      |    |     |    |      | 105 |  |

Output

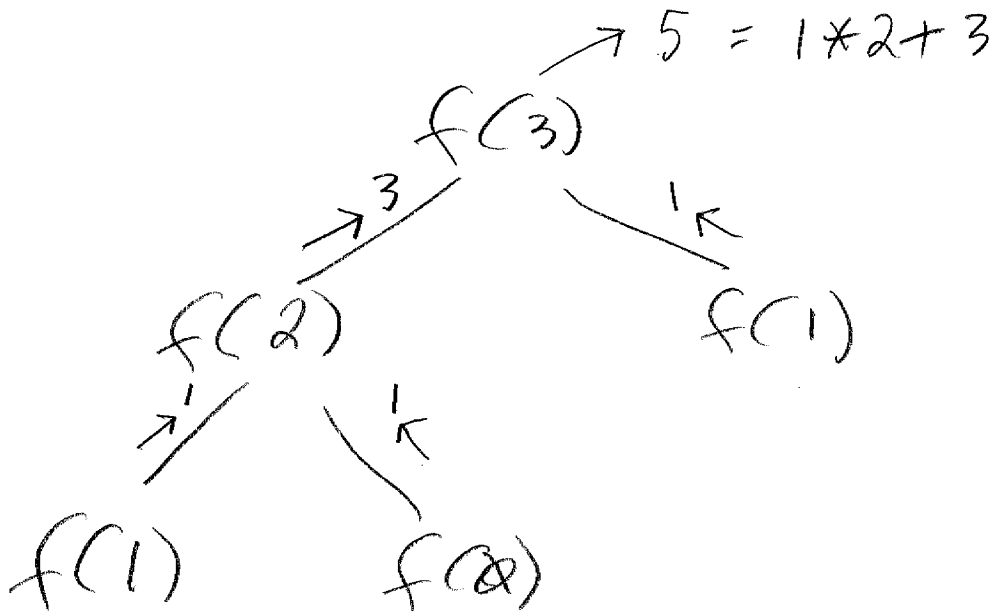
x = 40, y = 12, z = 3, a = 10, b = 21, c = 105

5. (20%) What is the output of the following program?

```
#include "stdio.h"

int f(int n)
{
    if (n == 0 || n == 1)
        return 1;
    else
        return f(n - 1) + 2 * f(n - 2);
}

void main ( )
{
    printf(" f(%d) is %d\n", 3, f(3) );
}
```



Output

f(3) is 5