

STUDENT ACTIVITY 1.3_2 KEY: RECURSION WORKSHEET

MTA Course: Software Development Fundamentals

Topic: Identify the appropriate method for handling repetition

File name: SoftDevFund_SA_1.3_2_key

Lesson Objective:

1.3: Identify the appropriate method for handling repetition.

Resources, software, and additional files needed for this lesson:

- SoftDevFund_PPT_1.3
- SoftDevFund_RL_1.3
- SoftDevFund_SA_1.3_1
- SoftDevFund_SA_1.3_1_key
- SoftDevFund_SA_1.3_2
- SoftDevFund_SA_1.3_2_key

Directions to the student:

Find the output to the following code segments. Use a trace table to help you obtain the final result.

Content:

```

1. public int identity(int num)
{
    if(num < 1)
        return 10;
    else
        return num + identity(num - 2);
}

int result = identity(10);
Console.WriteLine("The final answer is " + result);

```

identity(num)	Suspended actions	Popping back up the stack
identity (10)	10 + identity(8)	40
identity (8)	8 + identity(6)	30
identity (6)	6 + identity(4)	22
identity (4)	4 + identity(2)	16
identity (2)	2 + identity(0)	12
identity (0)	10	

```

2. public int negative(int num)
{
    if(num >= 20)
        return -5;
    else
        return negative(num + 4) + 2 * num;
}

int result2 = negative(-3);
Console.WriteLine("The final answer is " + result2);

```

negative(num)	Suspended actions	Popping back up the stack
negative(-3)	negative(-3 + 4) + 2*(-3)	79
negative(1)	negative(1 + 4) + 2*(1)	85
negative(5)	negative(5 + 4) + 2*(5)	83
negative(9)	negative(9 + 4) + 2*(9)	73
negative(13)	negative(13 + 4) + 2*(13)	55
negative(17)	negative(17+ 4) + 2*(17)	29
negative(21)	-5	

```

3. public int product(int num)
    {
        if(num > 20)
            return -1;
        else
            return num * product(-2 * num);
    }

int result3 = product(1);
Console.WriteLine("The final answer is " + result3);

```

product(num)	Suspended actions	Popping back up the stack
product(1)	1 * product(-2 * 1)	32768
product(-2)	-2 * product(-2 * -2)	32768
product(4)	4 * product(-2 * 4)	-16384
product(-8)	-8 * product(-2 * -8)	-4096
product(16)	16 * product(-2 * 16)	512
product(-32)	-32 * product(-2 * -32)	32
product(64)	-1	