**QUESTION 1**

1. The code below is used for this and the next question:

int fact\_2 (int N) {

    int res;

    printf("\n\t fact\_2(N=%d)",N);

    if (N <= 1) return 1;

    res= N\*fact\_2 (N-1);

    //T: res is:

    return res;

}

int main(){

    fact\_2(6);

}

The fact\_2(6) from main generates a sequence of recursive calls for fact\_2. What will res be at **time Tfor the call when N is 3** (generated from the original call to fact\_2(6) from main).

(Put a print statement right after the //T…  and run the code to check your answer.)



**11 points**

**QUESTION 2**

1. Similar to the question above: What would res be at time T, for the call when N is 5 (generated from the original call fact\_2(6))?



**11 points**

**QUESTION 3**

1. The code below will be used for this and the next question.

void fact\_tail\_2(int N, int\* res) {

    printf("\n\t fact\_tail\_2(N=%d,res=%d)",N,\*res);

    if (N <= 1) return;

    (\*res) = (\*res) \* N;

    //T1

    fact\_tail\_2(N-1, res);

}

 // Wrapper  function (sets parameters).

int fact\_tail\_2\_wrapper (int N) {

    int res = 1;

    fact\_tail\_2(N, &res);

    // T2: What will res be at this point?

    return res;

}

int main(){

    fact\_tail\_2\_wrapper(6);

}

What will res be at time T2 (in fact\_tail\_2\_wrapper) ? (Put a print statement right after the //T2… and run the code to check your answer.)



**11 points**

**QUESTION 4**

1. For the above code, what will res be at time T1 for the recursive call of fact\_tail\_2  for N=3, (generated from the call: fact\_tail\_2\_wrapper(6))?



**11 points**

**QUESTION 5**

1. int fact\_pr(int N, int res) {

    printf("\n\t fact\_pr(N=%d,res=%d)",N,res);

    if (N <= 1) return res;

    res = res \* N;

    return fact\_pr(N-1, res);

}

  // Wrapper  function (sets parameters).

int fact\_pr\_wrapper(int N) {

    int res = 1;

    int temp = fact\_pr(N, res);

    // T2: What will res be at this point?

    return temp;

}

int main(){

    fact\_pr\_wrapper(6);

}

What will res be at time T2? (Put a print statement right after the //T2…  and run the code to check your answer.)



**11 points**

**QUESTION 6**

1. int fact\_v3(int N) {

    int res = 1;

    if (N == 0) return res;

    res = res \* N;

    fact\_v3(N-1);

    return res;

}

What will fact\_v3(4) return?



**11 points**

**QUESTION 7**

1. The code below applies to this question and the next one.

int fact\_v4(int N) {

**static**int res = 1;

    if (N == 0) return res;

    res = res \* N;

    fact\_v4(N-1);

    return res;

}

int main(){

    int res1 = fact\_v4(4);

    int res2 = fact\_v4(4);

}

What value does res1 have?



**12 points**

**QUESTION 8**

1. For the program above,  what value does res2 have?



**12 points**

*Click Save and Submit to save and submit. Click Save All Answers to save all answers.*