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100 excellent

C.I.S. 1.5
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Second Examination

1. (20 points)
Perform the indicated conversions:

a. 11111001_{two} to decimal — 249

b. 459_{ten} to binary — 111001011

c. $1100111100010000111_{two}$ to hex — 33C47

d. 0xCA3 to decimal — 3235

e. 0xCA3 to binary — 110010100011

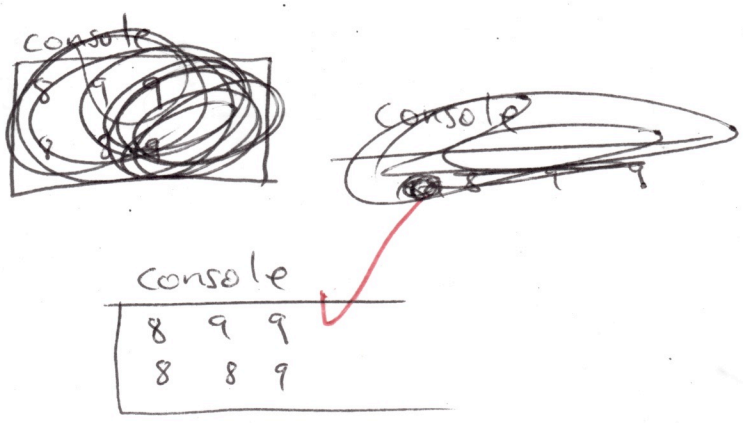
2. (10 points)
Write a function that receives an integer as a parameter and returns its cube (as an integer). For example, if the function receives 5 as a parameter, then it returns 125 (since 125 is the cube of 5). Do *not* write the main program.

```
int cube (int x) {
    return x*x*x
}
```

-0

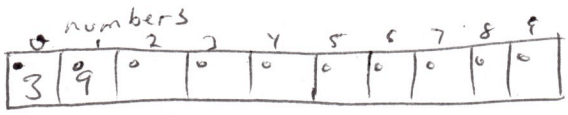
3. (10 points)
Show what is printed by the following C++ program:

```
#include <iostream>

using namespace std;

int main()
{
     int x, y, z;
     void rotate(int &, int &, int);

     x = 7;
     y = 8;
     z = 9;
     rotate(x, y, z);
     cout << x << "  " << y << "  " << z << endl;
     rotate(z, y, x);
     cout << x << "  " << y << "  " << z << endl;
     return 0;
} /*end main */


void rotate(int &x, int &y, int z)
{
     int t;

     t = x;
     x = y;
     y = z;
     z = t;
} /* end rotate */
```



4. (10 points)
What output will the following program produce? Assume the following data:

3 9 2 4 7 0 18 12 9 1 ^Z




```
#include <iostream>

using namespace std;

int main() {
    int numbers[10], i;

    for (i = 0; i < 10; i++)
        numbers[i] = 0;
    i = 0;
    cin >> numbers[i];
    while (!cin.eof()) {
        cout << numbers[i] << " ";
        i++;
        cin >> numbers[i];
    }
    cout << endl;
    i = 0;
    do {
        cout << numbers[i] << " ";
        i++;
    } while (numbers[i] != 0);
    cout << endl;
    return 0;
}
```

i
10
0
1
0
12

console

3 9 2 4 7 0 18 12 9 1

3 9 2 4 7

5. (10 points)
Show the output generated by the following program:

a	b	c
~~5~~ 3 1 -1	10	~~16~~ 18 20 22

```
#include <iostream>

using namespace std;

int main(void) {
     int a = 5, b = 10, c = 16;

     while (a > 0 ) {
          if (a < b - 6 && c % a == 0)
               cout << a << "  " << b << "  " << c << "  "
                    << "yes" << endl;
          else if (c < 5 * a)
               cout << a << "  " << b << "  " << c << "  "
                    << "maybe" << endl;
          else
               cout << a << "  " << b << "  " << c << "  "
                    << "no" << endl;
          c += 2;
          a -= 2;
     }
     cout << a << "  " << b << "  " << c << "  "
          << "final" << endl;
     return 0;
}
```

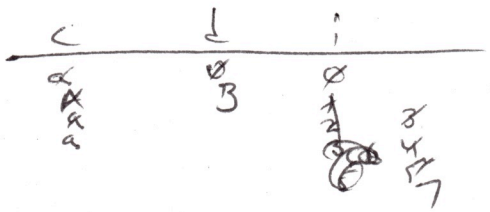
console

```
5  10  16  maybe
3  10  18  yes
1  10  20  yes
-1 10  22  final
```

-0

6. (10 points)
Given the following data, what will be the result of this program?

```
aAaa bbC cc  123<cr>
^z
```



```
#include <iostream>
#include <cctype>
using namespace std;

int main() {

    int d = 0, i = 0;
    char c;

    c = cin.get();
    while (cin) {
        if (c >='a' && c < 'z') {
            cout.put(c + 'A' - 'a');
            i++;
        } else if (isdigit(c))
            d++;
        else
            cout.put(c);
        c = cin.get();
    }
    cout << endl << d << " " << i << endl;
}
```

console

AAAA BBC CC

3 7

console

AAAA BBC CC

3 7

-0

7. (10 points)
Show what the following program prints. Assume that the user inputs the characters **feba** followed by a control-Z (^Z). Note: the ASCII value of 'a' is 97.

```
#include <iostream>
#include <cctype>

using namespace std;

int main() {
    char c, let;

    c = cin.get();
    while ( !cin.eof()) {
        switch (c) {
        case 'a' :
            let = c + 1;
            break;
        case 'b':
        case 'd':
            let = c - 1;
            break;
        case 'e':
            let = 'b';
            break;
        default:
            let = 'x';
        }
        cout << c << " " << let << " " << c << endl;
        c = cin.get();
    }
    return 0;
}
```

c	out
f	x
e	b
b	a
a	b
^D	

console

f	x	f
e	b	e
b	a	b
a	b	a

10

8. (20 points)
Write a complete main program and function to do the following:

The main program will read an integer value (in the range from 0 to 300) into a variable called **score**. Then the main program will send score to a function called **evaluate**; the main program will store the answer returned by the function (a single character) in a variable called **rating**. The main program should print both **score** and **rating**.

The function evaluate receives a single integer parameter, called **pins**. The function will compute and return a single character, depending upon the value of **pins**, as follows:

if **pins** is between (including both end points)	the value returned is:
0 and 99	B (for beginner)
100 and 199	G (for getting there)
200 and 299	P (for professional)
exactly 300	L (for lucky)
anything else	E (for error)

Be sure to comment your program and to provide all declarations and function prototypes.

```
#include <iostream>
#include <cstdlib>
using namespace std;

char evaluate (int pins)
{
    if (pins>=0 && pins<=99)
        return 'B';
    else if (pins>=100 && pins<=199)
        return 'G';
    else if (pins>=200 && pins<=299)
        return 'P';
    else if (pins == 300)
        return 'L';
    else
        return 'E';
}
```

```
int main()
{
                    //declarations
    int score;
    char rating;    //function prototyp
    char evaluate(int);

    cout << "Please enter a value"
         << " from 1 to 300"<<endl

    do{  //ensuring correct input
        cin>> score;
        if (score>300 || score<0)
            cout << "Try again"<<end
    } while (score>300 ||score <0);

//calling evaluate to recieve letter grade
    rating = evaluate (score);

//output
    cout <<"A score of " << score<<
         "has a rating of "<<rating
         <<endl;
    return 0;
}
```