

# MID TERM

## Exam from 2006

### Q1). [10 points]

Express the following as C++ Boolean expressions. Assume variables X, Y, hit and target have already been declared.

- a) At least one of X or Y is odd. [1]
- b) The hit is no more than 2.5 units away from target. [1]
- c) Give one example of each of the following errors. [2]
  - a. Compile time error
  - b. Runtime Error
  - c. Linker Error
  - d. Logical Error
- d) Give **two** advantages of top down design. [1]

```
double C=12.5;
double celsius(double f);

int main(){
    double f = 50.0;
    double ans=celsius(f);
    f=60.0;
    cout<<"f="<<f<<" C="<<C<<" ans="<<ans<<endl;
    return 0;
}

double celsius(double f){
    double C;
    C= 5.0 / 9.0 * (f - 32.0);
    cout<<"C="<<C<<endl;
    cout<<"::C="<<::C<<endl;
    return C;
}
```

- e) What is the output of the above program?

### Q2). [5 points]

What is the output of the following program?

```
void something(int size); //prototype
int main(){
    int val=6;
    something(val);
    return 0;
}

void something(int size){
    int i, j;
    for (i=0; i<size; i++){
        j=i;
        while(j){
            cout<<" ";
        }
    }
}
```

```

        j--;
    }
    cout<<"****\n";
}
for (i=size-1; i>=0; i--){
    j=i;
    while(j){
        cout<<" ";
        j--;
    }
    cout<<"****\n";
}
}

```

### Q3). [10 points]

a) What is the output of the following program segment? [5]

```

int day, i;
for(day = 1; day <= 3; day = day + 1){
    cout<<"On day "<<day<<" of school, I learnt\n";
    for(i = day; i > 0; i = i - 1){
        if(i == 1){
            if(day == 1) cout<<"A ";
            else cout<<"And a ";
            cout<<"simple addition question.\n";
        }else if(i == 2)
            cout<<"How to say ABCs,\n";
        else if(i == 3)
            cout<<"How to draw with crayons,\n";
    }
    cout<<"\n";
}

```

b) The previous code uses nested if-else statements. You have to re-write it using switch statements only, in the space given below. [5]

**Note:** You cannot use if-else along with switch.

```

int day, i;
for(day = 1; day <= 3; day = day + 1){
    cout<<"On day "<<day<<" of school, I learnt\n";
    for(i = day; i > 0; i = i - 1){
        //YOUR CODE HERE
    }
    cout<<"\n";
}

```

### Q4). [5 points]

The code given below has an error. Sometimes it gives correct output, sometimes wrong output. Explain the reason.

```

/* The in_order function returns 0 if the elements of array a are all
in ascending order, e.g. 1.2, 2.1, 3.3, 3.5, 4.5, 7.9, 8.4, 8.7, 9.9,

```

10.0

It returns the index of the first element of the array that is out of order. e.g. if user enters 1.2, 2.1, 3.3, 3.5, 4.5, 7.9, 5.4, 8.7, 9.9, 10.0 it would return 6. \*/

```
int in_order(void);
int main(){
    int ret_val;
    ret_val = in_order();
    cout<<ret_val<<endl;
    return 0;
}

int in_order(void){
    int i;
    const int size=10;
    double a[size];
    for(i=0; i<size; i++)
        cin>>a[i]; //fill in the array
        for(i=0; i < size ; i++){
            if (a[i] > a[i+1]){
                return i+1;
            }
        }
    return 0;
}
```

Q5). [7 points]

Consider the following program segment.

```
char input[100], answer[100];
gets(input);
int i=0;
while(input[i]){
    if (' ' == input[i]) //checking for space
        answer[i]=' ';
    else{
        answer[i]=input[i] - 1;
    }
    i++;
}
answer[i]=input[i]; //Statement A
cout<<answer<<endl;
```

a) What is the output if the user enters Bvg Xjfefstfifo" [4]

Note: " is part of string entered by user

b) What would happen if I remove Statement A in the above code? Explain.

[3]

**Q6). [7 points]**

Consider the following program segment.

```
int i,j, input_len, temp;
const int NUMS=10;
const int LENGTH=20;
char input[LENGTH];
char rocks[NUMS][LENGTH]={
"Claystone",
"Flint",
"Limestone",
"Marble",
"Quartzite",
"Slate",
"Basalt",
"Granite",
"Coal",
"Chalk"
};
cin>>input;
input_len=strlen(input);
j=input_len-1;
for(i=0; i<(input_len/2); i++){
    //swap
    temp =input[i];
    input[i] = input[j];
    input[j] = temp;
    j--;
}
cout<<"input="<<input<<endl;
for (i=0; i<NUMS; i++){
    if (!strcmp(rocks[i], input)){
        cout<<"I wonder...\n"; // Statement A
        break;
    }
}
```

- a) What is the output if the user enters Marble [4]
- b) What should the user enter so that Statement A is executed? Explain. [3]

**Q7). [6 points]**

What is the output of the following program segment?

```
int i;
int array[3]={10, 15, 20};
int *ptr1, *ptr2, *ptr3;
ptr1 = array;
ptr2 = array+1;
ptr3 = array+2;
*ptr2 = 6;
ptr2 = ptr3;
*ptr2 = 4;
++(*ptr1);
//print array
for (i=0; i<3; i++)
    cout<<array[i]<<" ";
cout<<endl;
```

```
++ptr1;  
*ptr1 = 14;  
//print array again  
for (i=0; i<3; i++)  
    cout<<array[i]<<" ";  
cout<<endl;
```