Name: _____
Score: _____ / _____

Final Exam

Part 1

Which of the following is/are correct? (Select all that apply.)

- [ ] A. We cannot change the arguments of a function that are declared constant
- [ ] B. C++ enables us to define functions that take constants as an argument

Answer Point Value: 5.0 points
Answer Key: A,B

Match the vocabulary words with their definitions.

1. machine language	A. a collection of generally useful procedures available to the programmer
2. assembly language	B. a machine dependent file that contains all the instructions necessary to perform a task
3. source code	C. the high level code written by the programmer that is usually machine independent
4. object code	D. a program that combines one or more object files with a set of libraries and produces an executable program
5. library	E. a language in which a single instruction translates directly into a single machine instruction
6. linker	F. a language consisting of a series of numbers that represent the actual instructions used by the computer
7. executable program	G. the source code after it has been translated into machine language

Answer Point Value: 15.0 points
Answer Key: 1:F, 2:E, 3:C, 4:G, 5:A, 6:D, 7:B

Compilation is the step in the software development cycle where these type of errors are detected.

- A. specification errors
- B. semantics errors
- C. logic errors
- D. syntax errors

Answer Point Value: 5.0 points
Answer Key: D

All of these are C++ data types except:

- A. bool
- B. main
- C. double
- D. int
- E. char

Answer Point Value: 5.0 points
Answer Key: B

Which of the following are C++ keywords (reserved words)? (Select all that apply.)

- [ ] A. else
- [ ] B. return
- [ ] C. const
- [ ] D. using

Answer Point Value: 5.0 points
Answer Key: A,B,C,D

A structured data type of similarly typed elements which are accessible using indices is called:

- A. array
- B. union
- C. bag
- D. set

Answer Point Value: 5.0 points
Answer Key: A

Searching is a fundamental problem associated with arrays that seeks to:

- A. reorder the elements in the array
- B. locate in the array where the target element is
- C. delete the elements in the array
- D. insert into the array the target element

Answer Point Value: 5.0 points
Answer Key: B

Sorting is a fundamental problem associated with arrays that seeks to:

- A. delete the elements in the array
- B. locate in the array where the target element is
- C. reorder the elements in the array
- D. insert into the array the target element

Answer Point Value: 5.0 points
Answer Key: C

A call-by-reference parameter is indicated by attaching the _____ to the end of the type name in the formal parameter.

- A. vertical bar, |
- B. hyphen, -
- C. ampersand sign, &
- D. semicolon, ;

Answer Point Value: 5.0 points
Answer Key: C

If an array variable is declared as **vector<int> score**, and **score.size()** = 5, then the valid range of array indexes for score is:

A.
5 ... 5

B.
0 ... 4

C.
0 ... 5

D.
1 ... 5

Answer Point Value: 5.0 points
Answer Key: B

We want to write a function that uses two string parameters, a first name and a last name, and prints out the full first and last name to the console with a space between them. Take a look at the source code below.

```
_________ print_name(string first, string last) {

        cout <<first <<""<<last <<endl;

}
```

Which return type(s) could be used in the blank above? (Select all that apply.)

- [ ] A. int
- [ ] B. short
- [ ] C. long
- [ ] D. void
- [ ] E. char
- [ ] F. bool
- [ ] G. unsigned
- [ ] H. string
- [ ] I. double
- [ ] J. float

Answer Point Value: 6.0 points
Answer Key: D

We want to write a function that uses two string parameters, a first name and a last name, and returns the full first and last name with a space between them. Take a look at the source code below.

```
_________ print_name(string first, string last) {

        return first + ""+ last;

}
```

Which return type(s) could be used in the blank above? (Select all that apply.)

- [ ] A. int
- [ ] B. short
- [ ] C. long
- [ ] D. char
- [ ] E. unsigned
- [ ] F. float
- [ ] G. string
- [ ] H. double
- [ ] I. void
- [ ] J. bool

Answer Point Value: 6.0 points
Answer Key: G

```
int credit_score(int x) {
        int score = x;
        x -= {a};
        return score;
}
int main() {
        int x = {b};
        cout <<credit_score(x) <<endl;
        cout <<x <<endl;
}
```

Two values are printed to the console. What are these two numbers?

Number 1: credit_score(x) = {{c}}

Number 2: x = {{d}}

Answer Point Value: 5.0 points
Answer Key: c = {b}, d = {b}

```
int credit_score(int &x) {
        int score = x;
        x -= {a};
        return score;
}
int main() {
        int x = {b};
        cout <<credit_score(x) <<endl;
        cout <<x <<endl;
}
```

Two values are printed to the console. What are these two numbers?

Number 1: credit_score(x) = {{c}}

Number 2: x = {{d}}

Answer Point Value: 5.0 points
Answer Key: c = {b}, d = {b} - {a}

```
int credit_score(int &x) {
        int score = x;
        int *z = &x;
        x -= 10;
        cout <<&z <<endl;
        cout <<z <<endl;
        cout <<*z <<endl;
        return score;
}
int main() {
        int x = 700;
        credit_score(x);
}
```

Three values are printed to the console. What are these three numbers?

A.
Number 1: &z = the memory address of z;

Number 2: z = the memory address of x;

Number 3: *z = 700

B.
Number 1: &z = the memory address of x;

Number 2: z = the memory address of x;

Number 3: *z = 690

C.
Number 1: &z = the memory address of z;

Number 2: z = 700;

Number 3: *z = 690

D.
Number 1: &z = the memory address of z;

Number 2: z = the memory address of x;

Number 3: *z = 690

E.
Number 1: &z = the memory address of z;

Number 2: z = the memory address of z;

Number 3: *z = 700

Answer Point Value: 7.0 points
Answer Key: D

Examine the code below. What does the following function do?

```
int mystery(int x, int y, int z) {
        int temp;     // ultimately, holds returned value
        temp = x;     // assume the largest is x
        if (y >temp) {
                temp = y;
        }
        if (z >temp) {
                temp = z;
        }
        return temp;
}
```

Answer Point Value: 5.0 points
Model Short Answer: --------

Write a function that returns the last element in a vector of strings. The operation **vector.size()** returns the number of elements in a vector. For example, if a vector contained the following elements: **["a", "b", "c", "d"]**, then **vector.size()** = 4. The program should return d.

(Note: The solution code is approximately 4-6 lines.)

Answer Point Value: 6.0 points
Model Short Answer: --------

* EXTRA CREDIT * [10pts]

Write a function that returns true if and only if the unsigned int Y represents a leap-year. There are two rules for determining leap years. (Note: Y is a century-year if it's evenly divisible by 100.):

Rule 1: If Y is a century-year then Y is a leap-year if it's evenly divisible by 400. For example, century-years 1700, 1900, 1800, and 3400 are not leap-years since they're not divisible by 400. But the century-years 1600, 2000, and 2400 are leap years because they are evenly divisible by 400.

Rule 2: If Y is not a century-year, then it's a leap year if it's evenly divisible by 4.

You can assume that Y is greater than 0. In C++, the % operator calculates the remainder when you divide two ints. Thus, Y is a century year when (Y % 100) == 0, and if (Y % 4) == 0, then Y is evenly divisible by 4.

(Note: The solution code is approximately 8-10 lines.)

Answer Point Value: 0.0 points
Model Short Answer: --------