Print your name: KAI-YIN HUANG

Score:

**22:198:605 Introduction to Software Development**

**Midterm Exam**

**25 points**

*Please turn off your cellphone.*

*This is an exam not a teamwork. You cannot refer to your homework, lab works or the PPT files. I do* NOT *tolerate cheating*. Students are responsible for understanding the RU Academic Integrity Policy (as listed in the course’s syllabus). I will strongly enforce this policy and pursue *all* violations.

Alternate seating: do not sit next to another student or in your usual seat.

This exam is closed book. You can use your computer to debug but you cannot use it to read or check references.

I can only grade what you provide. If I cannot read I cannot grade.

If not specified in the questions, assume all questions are compiled using Visual Studio 2015 or 2017 Community Edition.

This exam is from 10:10 am to 12: 50 pm.

Exam Questions: Multiple choices (2 points)

1. The following type of errors could happen when programming (select all that apply)

[ x ] compile-time errors [ ] memory errors [ x ] run-time errors

[x ] logic errors [x ] time-link errors

1. System bus consists of: (select all that apply)

[ x ] control bus [ ] memory bus [x ] address bus [x ] data bus [ ] I/O bus

Fill in the blanks below: (4 points)

1. Memory is to \_\_\_\_store data\_\_\_\_\_\_ and \_\_\_program instructions\_\_\_\_ for \_\_\_CPU\_\_ to execute.
2. The \_\_\_\_\_ central processing unit\_\_\_\_\_\_\_\_\_(\_\_\_\_CPU\_\_\_\_\_\_\_\_\_) is the brain of a computer.
3. According to the rules of logic, write the return of the operators in the blanks blow:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| a | b | a || b | a && b | !b |
| True | True | True | True | False |
| False | True | True | False | False |
| True | False | True | False | True |
| False | False | False | False | True |

-Decimal <-> Binary convert. Please **list full steps**: (1 points)

10111011 (bin to dec)

1\*2^0 + 1\*2^1 + 0\*2^2 + 1\*2^3 + 1\*2^4 + 1\*2^5 + 0\*2^6 + 1\*2^7 = 187

669 (dec to bin)

669/2 = 334…1

334/2 = 167…0

167/2 = 83…1

83/2 = 41…1

41/2 = 20…1

20/2 = 10…0

10/2 = 5…0

5/2 = 2…1

2/2 = 1…0

1/2 = 0…1

669 dec to bin is 1010011101

-Give **TWO examples** of each type below by **declaring the type and initializing** them: (2 points)

Integer literals:

int num1 = 0;

int num2 = 1;

Boolean literals:

bool f1 = true;

bool f2 = false;

Character literals:

char c1 = 'a';

char c2 = 'x';

Floating-point literals:

double float1 = -0.54;

double float2 = 1.2e3;

-Write **a while loop** that is equivalent to the for loop below:

(while loop itself only. Not full program. 2 points)

for (int x =0; x < =15; x = x +1)

cout <<x<< “\n”;

Answer:

int x = 0;

while(x <= 15)

{

cout << x << "\n";

x = x + 1;

}

-**Finish the program** below by writing in blanks. The program takes a defined value, multiplies it and outputs (2 points):

#include <iostream>

using namespace std;

void squareByptr (int \*ptr){

//write function body

\*ptr = (\*ptr) \* (\*ptr);

}

int main() {

int x = 20

squareByPrt ( &x )

cout << x ; // The program outputs 400

return 0;

}

-How many times does the **loop execute**? (1 points): Answer here\_\_\_\_\_\_\_\_101\_\_\_\_\_\_\_\_\_\_

for (i = 0; i < =100; i++) {

TestFunction(1);}

-And this one? Answer here\_\_\_\_\_\_\_\_\_99\_\_\_\_\_\_\_\_\_

for (i = 1; i < 100; i++) {

TestFunction(1);}

-What does the function below do? (1 points) Write your answer here\_\_\_\_\_returns the largest of the three integer values \_\_\_\_\_\_\_\_\_\_\_\_\_\_

int question(int x, int y, int z)

{int temp;

temp = x;

if(y > temp) { temp = y; }

if(z > temp) { temp = z; }

return temp;

}

*Programming section: 1) c/p screen shots of your running program and the entire code. Program output or input samples are needed. 2) When a header file is specified, please use the specified header. If no header file is specified, use any one that would work with your programs.*

1. Using **nested control** structures and **our course’s header** file, write a **full program** that determines the value of the user inputted and provides the following conditional feedbacks to the user; The program runs continuously until user type in q. Draw a flowchart of this program. (3 points):

You entered 1

You entered 2 or 3

You did not enter 1, 2, or 3

Answer:

#include "std\_lib\_facilities.h"

int main() {

string input;

while (true) {

cout << "Enter a number (1, 2, 3) or 'q' to quit: ";

cin >> input;

if (input == "q") {

break;

}

else if (input == "1") {

cout << "You entered 1" << endl;

}

else if (input == "2" || input == "3") {

cout << "You entered 2 or 3" << endl;

}

else {

cout << "You did not enter 1, 2, or 3" << endl;

}

}

return 0;

}

一張含有 文字, 螢幕擷取畫面, 字型 的圖片

自動產生的描述

一張含有 文字, 螢幕擷取畫面, 字型, 數字 的圖片

自動產生的描述

一張含有 圖表, 工程製圖, 方案, 行 的圖片

自動產生的描述

1. **Write a function** and **use it in your main program** to print out number of asterisks (\*) based on the number the user inputted. Keep allowing user to input and provide a method that allows user to terminate the program. For example, when user entered 5, the output should be (2 points):

\*\*\*\*\*

\*\*\*\*

\*\*\*

\*\*

\*

Answer:

#include <iostream>

#include <string>

using namespace std;

void asterisks(int n) {

for (int i = n; i > 0; --i) {

for (int j = 0; j < i; ++j) {

cout << "\*";

}

cout << endl;

}

}

int main() {

int number;

string input;

while (true) {

cout << "Enter a number (or 'q' to quit): ";

cin >> input;

if (input == "q") {

break;

}

try {

number = stoi(input);

asterisks(number);

}

catch (const invalid\_argument& e) {

cout << "Please enter a valid number or 'q' to quit." << endl;

}

}

return 0;

}

一張含有 文字, 螢幕擷取畫面, 字型 的圖片

自動產生的描述

一張含有 文字, 螢幕擷取畫面, 陳列, 軟體 的圖片

自動產生的描述

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自動產生的描述

1. Using **header iostream** and **struct** that has three components to write a full program that outputs the line below. The struct’s **tag** should be named bday. Declare a struct **variable** and name it BirthDay. (2 points):

The birthday is: 3/7/2024

Answer:

#include <iostream>

using namespace std;

struct bday {

int month;

int day;

int year;

}BirthDay;

int main() {

bday BirthDay = { 3, 7, 2024 };

cout << "The birthday is: " << BirthDay.month << "/" << BirthDay.day << "/" << BirthDay.year << endl;

return 0;

}

一張含有 文字, 螢幕擷取畫面, 軟體, 多媒體軟體 的圖片

自動產生的描述

一張含有 文字, 螢幕擷取畫面, 字型 的圖片

自動產生的描述

1. The Fibonacci series

0, 1, 1, 2, 3, 5, 8, 13, 21, ……….

begins with 0 and 1 and has the property that each subsequent Fibonacci number is the sum of the previous two Fibonacci numbers. The Fibonacci series can be defined recursively as follows:

Fibonacci (0) = 0

Fibonacci (1) = 1

Fibonacci (n) = Fibonacci ( n – 1 ) + Fibonacci ( n – 2 )

Write a program to accept one argument from the command line. The program displays a message to show its usage when no argument is given. The program takes one numeric argument as the input. If more than one arguments are given, an error message will be displayed. The program should have a function to calculate the nth Fibonacci number recursively and display the results. You should define the Fibonacci number type as double. (3 points)

Sample output:

---------------------------------------------------------------

C:\ >Mid-termQ4.exe

Please type in at least one parameter.

C:\ >Mid-termQ4.exe 2 1

Please type in just one parameter.

C:\ >Mid-termQ4.exe 8

Fibonacci(0)=0

Fibonacci(1)=1

Fibonacci(2)=1

Fibonacci(3)=2

Fibonacci(4)=3

Fibonacci(5)=5

Fibonacci(6)=8

Fibonacci(7)=13

Fibonacci(8)=21

------------------------------------------------------------------

#include <iostream>

using namespace std;

double fib(int n) {

if (n <= 0) {

return 0;

}

else if (n == 1) {

return 1;

}

else {

return fib(n - 1) + fib(n - 2);

}

}

int main(int argc, char\* argv[]) {

if (argc == 1) {

cout << "Please type in at least one parameter." << endl;

return 1;

}

if (argc > 2) {

cout << "Please type in just one parameter." << endl;

return 1;

}

int n = atoi(argv[1]);

for (int i = 0; i <= n; ++i) {

cout << "Fibonacci(" << i << ") = " << fib(i) << endl;

}

return 0;

}

一張含有 文字, 螢幕擷取畫面, 軟體, 字型 的圖片

自動產生的描述

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