# EECS 168 2021 Spring Midterm: TR

# Rules

* You have 24 hours from the start of your normal lecture section to submit
* DO NOT alter the formatting of the test. Any changes to formatting could result in grading errors
* DO NOT use wordpad (it alters the format)
* Only mark your answers within designated answer boxes
* Read and sign below
* Any strange characters you see are there on purpose
* **Unauthorized aid:** google searches, the materials or help of other students, past exams, help from the undergrad staff or GTAs, **any compilers** (e.g. don't just put the code problems in a compiler and run them), or **chegg.com**

I am fine with you using the following authorized aid:

* **Authorized aid**: your notes, your labs (the code, not the compiler), materials on the class website, your amazing brain

|  |  |
| --- | --- |
| Your Name | Morgan Bergen |
| KUID | 3073682 |

I'd like this exam to still be an assessment of your skill and understanding. If you agree to this, then please type the name of someone who would be heartbroken if they knew you cheated on this exam.

|  |  |
| --- | --- |
| Their Name | My future employer. Let’s just say for simplicity sake, Larry Page (I don’t want to work for a large technology corporation, because the organization only in so far cares about you for your working capital, and nothing more; however I have never received any offers, and I am always biased to market place incentives, so I can’t know for sure.) |

# 

# 

# [10pts] True/False

Place an X in the column of the answer you wish to choose. For example, if you think the answer is true, put an X in the true column.

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Question** | **True** | **False** |
| 1 | When declaring a variable you choose its type and name | X |  |
| 2 | The expression ((1 / 2)\*3.14159\*4738.112) will result in 7442.6  Reminder: NO CALCULATORS ALLOWED! |  | X |
| 3 | In a for loop, initialization, looping condition, and progression ALL occur multiple times | X |  |
| 4 | The following line is valid:  char symbol = '';//no space between quotes |  | X |
| 5 | Strings have a built in method called *count()* that returns how many characters are in the string |  | X |
| 6 | Heap-allocated arrays have a built in method call length() that returns how many elements are in the array | X |  |
| 7 | A do-while loop will run one time before checking the loop condition | X |  |
| 8 | The data type int cannot retain data passed the decimal point | X |  |
| 9 | The type std::string can hold zero or more characters | X |  |
| 10 | The % operator will return the remainder of long division | X |  |

# [10pts] Variable Names

In the table below, indicate whether or not a given variable name will compile. They don't have to be meaningful, I'm just asking if they will compile.

|  |  |  |
| --- | --- | --- |
| **Variable name** | **Will it compile? (yes or no)** | **If it does not compile, why not?** |
| thisDoesNotCompile! | No | The ! is a designated comparison operator, meaning it’s use in source code is purposed for evaluating conditions (for example != is an operator to come to a Boolean return by evaluating if two things are not equal to one another, and therefore is omitted from being used as a character for variable declaration. |
| I\_WILL\_COMPILE | Yes |  |
| g++ | No | The + is an arithmetic operator, meaning that it’s only designated to evaluate expressions, and therefore is omitted from being used as a character for variable declaration. |
| <int> | No | The <int> is a designed keyword and is not to be used for naming variables |
| y\_o\_y\_o | yes |  |
| for | No | The combination of the characters, for, is a designated keyword intended to be used for looping mechanisms, and therefore cannot be used to declare variables. |
| toeJam&Earl | No | Same as the ! operator, the & is a comparison operator |
| cheeeeseC4k3 | Yes |  |
| DontCheatOnThisExam | Yes |  |
| 1stname | yes |  |

# [40pts] Code Writing

For both code writing problems, assume sensible input from the user.

1. [20pts] Write a complete main.cpp to do the following:

* [2pts] Obtain an n for an n x n grid from the user.
* [15pts] Print an n x n grid of the pattern given below
* [1pts] Sensible variable names
* [1pts] Sensible variable types
* [1pts] Complete main

Sample output for given n

|  |  |  |
| --- | --- | --- |
| n = 5 | n = 4 | n = 3 |
| D111D  2D2D2  33D33  4D4D4  D555D | D11D  2DD2  3DD3  D44D | D1D  2D2  D3D |

**Write your code on the space provided on the following page**

Your code below:

|  |
| --- |
| #include <iostream>  int main(){  int size;  std::cout << "Please input a number: ";  std::cin >> size;  std::cout << '\n';  // determining if the grid has a median  double median = ((size + 1)/2.0);  std::cout << "n = " << size << '\n';  for (int i = 1; i <= size; i++) {  if (i == 1 || i == size) {  for (int j = 1; j <= size; j++) {  if (j == 1 || j == size) {  std::cout << 'D';  } else {  std::cout << i;  }  }  // if there is no median  } else if ((floor(median) != median && ceil(median) != median)) {  for (int j = 1; j <= size; j++) {  if (j == 1 || j == size) {  std::cout << i;  } else {  std::cout << 'D';  }  }  // if there is a median  } else if (i == median) {  for (int j = 1; j <= size; j++) {  if (j % 2 == 0) {  std::cout << 'D';  } else {  std::cout << i;  }  }  } else {  for (int j = 1; j <= size; j++) {  if (j % 2 == 0) {  std::cout << 'D';  } else {  std::cout << i;  }  }  }  std::cout << '\n';  }  return(0);  } |
|  |

# [40pts] Code Writing

1. [20pts] Write a complete main.cpp to do the following:

* [2pts] Create two arrays of characters based on sizes from the user (the arrays do NOT need to be the same size).
* [2pts] Let the user fill each array with characters
* [10pts] After the arrays are filled, you will swap as many values as possible between the arrays (remember, the arrays may be different sizes!) and print the updated arrays

Example:

Arrays before the swap: Arrays after the swap:

array1: [a, b, c, d, e, f, g] array1: [x, y, z, d, e, f, g]

array2: [x, y, z] array2: [a, b, c]

* [4pts] After printing the message, ask the user if they want to exit. If they type an 'e' or 'E' then the program should exit, otherwise repeat the entire program until they want to exit.
* [1pts] Sensible variable names
* [1pts] Sensible variable types

**Write your code on the space provided on the following page**

Your code below:

|  |
| --- |
| #include <iostream>  int main(){    char choice = '\0';    do {    char choice = '\0';  int size1 = 0;  int size2 = 0;  char array1[size1];  char array2[size2];    std::cout << "\nEnter a size number: ";  std::cin >> size1;    // recieving array input from user  for (int i = 1; i <= size1; i++) {  std::cout << "Enter character (" << i << '/' << size1 << ") : ";  std::cin >> array1[i];  }    char stored1[size1];  char secondStored1[size1];  // storing the values into an array  for (int i = 1; i <= size1; i++) {  stored1[i] = array1[i];  }  for (int i = 1; i <= size1; i++) {  secondStored1[i] = array1[i];  }  std::cout << "\nEnter a size number: ";  std::cin >> size2;    // recieving array input from user  for (int i = 1; i <= size2; i++) {  std::cout << "Enter character (" << i << '/' << size2 << ") : ";  std::cin >> array2[i];  }    char stored2[size2];  char secondStored2[size2];  // storing the values into an array  for (int i = 1; i <= size2; i++) {  stored2[i] = array2[i];  }  for (int i = 1; i <= size2; i++) {  secondStored2[i] = array2[i];  }  // printing arrays before the swap to the user  std::cout << "\nArrays before the swap: ";  std::cout << "\narray1: ";  for (int i = 1; i <= size1; i++) {  if (i == 1) {  std::cout << '[' << stored1[i] << ", ";  } else if (i == size1) {  std::cout << stored1[i] << ']';  } else {  std::cout << stored1[i] << ", ";  }  }    std::cout << "\narray2: ";  for (int i = 1; i <= size2; i++) {  if (i == 1) {  std::cout << '[' << stored2[i] << ", ";  } else if (i == size2) {  std::cout << stored2[i] << ']';  } else {  std::cout << stored2[i] << ", ";  }  }    // sorting algorithm  std::cout << "\n\nArrays after the swap: ";  if (size1 > size2) {  for (int i = 1; i <= size2; i++) { //swapped  stored1[i] = stored2[i];  }  for (int i = 1; i <= size2; i++) { //swapped  secondStored2[i] = secondStored1[i];  }  std::cout << "\narray1: ";  for (int i = 1; i <= size1; i++) {  if (i == 1) {  std::cout << '[' << stored1[i] << ", ";  } else if (i == size1) {  std::cout << stored1[i] << ']';  } else {  std::cout << stored1[i] << ", ";  }  }  std::cout << "\narray2: ";  for (int i = 1; i <= size2; i++) {  if (i == 1) {  std::cout << '[' << secondStored2[i] << ", ";  } else if (i == size2) {  std::cout << secondStored2[i] << ']';  } else {  std::cout << secondStored2[i] << ", ";  }  }  std::cout << '\n';  } else if (size2 > size1) {  for (int i = 1; i <= size1; i++){ //swapped  stored2[i] = stored1[i];  }  for (int i = 1; i <= size2; i++){ //swapped  secondStored1[i] = secondStored2[i];  }  std::cout << "\narray1: ";  for (int i = 1; i <= size1; i++) {  if (i == 1) {  std::cout << '[' << secondStored1[i] << ", ";  } else if (i == size1) {  std::cout << secondStored1[i] << ']';  } else {  std::cout << secondStored1[i] << ", ";  }  }  std::cout << "\narray2: ";  for (int i = 1; i <= size2; i++) {  if (i == 1) {  std::cout << '[' << stored2[i] << ", ";  } else if (i == size2) {  std::cout << stored2[i] << ']';  } else {  std::cout << stored2[i] << ", ";  }  }  } else {  for (int i = 1; i <= size1; i++) {  stored1[i] = stored2[i];  }  for (int i = 1; i <= size1; i++) {  secondStored2[i] = secondStored1[i];  }  std::cout << "\narray1: ";  for (int i = 1; i <= size1; i++) {  if (i == 1) {  std::cout << '[' << stored1[i] << ", ";  } else if (i == size1) {  std::cout << stored1[i] << ']';  } else {  std::cout << stored1[i] << ", ";  }  }  std::cout << "\narray2: ";  for (int i = 1; i <= size1; i++) {  if (i == 1) {  std::cout << '[' << secondStored2[i] << ", ";  } else if (i == size1) {  std::cout << secondStored2[i] << ']';  } else {  std::cout << secondStored2[i] << ", ";  }  }  }  std::cout << "\n;      std::cout << "Would you like to exit? (e/E): ";  std::cin >> choice;  std::cout << '\n';    } while ((choice == 'e') || (choice == 'E'));    return(0);  } |

This should be page 8.

If it is not, please correct any page edit that caused the page numbers to be altered.

The exam is over.

Email your exam to your TA.