

CS 6015 Midterm Exam

Read through these instructions carefully!

- DO NOT BEGIN UNTIL INSTRUCTED TO DO SO but write your name and UNID on the lines below now
- You may use only a pen/pencil on this exam.
- Your exams will be scanned and graded using an automated tool. To make sure you're graded for your work, write your answers in the appropriate spaces. You should have enough space to answer each question, but if you need extra space for some reason, use this front page and make a clear note on the question that we should look here to grade it
- Use clear, complete sentences to answer questions in English
- Unless the question explicitly states it, there are no intentional errors in code samples provided in the exam

Name: _____ UNID: _____

| Question | Points | Score |
|----------|--------|-------|
| 1 | 1 | |
| 2 | 1 | |
| 3 | 1 | |
| 4 | 1 | |
| 5 | 1 | |
| 6 | 1 | |
| 7 | 1 | |
| 8 | 1 | |
| 9 | 1 | |
| 10 | 1 | |
| 11 | 1 | |
| 12 | 1 | |
| 13 | 1 | |
| 14 | 1 | |
| 15 | 1 | |
| 16 | 1 | |
| Total: | 16 | |

1. (1 point) You were hired as a software developer to work on a Navigator project. The team is using GitHub to backup and share code. You made a directory called Nav on your local machine.

GitHub repo Link: <https://github.com/cmd/navPro.git>

a) How to initialize and create a local repo on your local machine?

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b) You deleted a file from your local directory, what is the git command to restore that file from the remote repo?

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c) One of your colleagues updated nav.hpp and successfully sync the changes. You were updating the same file but when you tried to sync the changes, you received an error. How to overcome that conflict and sync the changes using git commands?

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2. (1 point) Below is part of your Makefile.

```
...
msdscript: $(OBJS)
c++ -o msdscript $(OBJS)

test: msdscript
    ./msdscript --test

doc: msdscript
```

...

a) You tend to run make msdscript but you can not. How to resolve that (assuming all object files are successfully created and represented by OBJS macros)?

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b) You decided to use doxygen to extract html files from your source code and save them in a folder called documentation. Complete the rule doc to achieve that. (You need cd to change the directory)

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3. (1 point) Give the code below followed by a test case.

```
int returnInput(int input, bool cond1, bool cond2, bool cond3, bool cond4){
    int x = input;
    int y = 0;
    if (cond1)
        x++;
    if (cond2)
        x--;
    if (cond3)
        x=0;
```

```

        if (cond4)
            y=x;
return y;
}

int returnNum(int input){
    int y = input;
    ..
    ..
    return y;
}

TEST_CASE( "Return Input Fucntion") {
    CHECK( returnInput(x, false, false, true, false) == x );
    CHECK( returnInput(x, false, false, false, false) == x );
    CHECK( returnInput(x, false, false, true, true) == x );
    CHECK( returnInput(x, true, true, false, false) == x );
}

```

a) What is the achieved Path Coverage for the given test case?

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b) What is the achieved function Coverage for the given test case?

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4. (1 point) List 4 representatives that you would consider when testing a function that checks if a string is palindrome

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5. (1 point) What is the difference between SECTION and TEST_CASE in catch2 testing framework that you have been using in your MSDScript?

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6. (1 point) What does it mean to debug a program?

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7. (1 point) Give the code below stored in **binarySearch.cpp**:

```
int main(int argc, char **argv) {
    int i;
    i = binarySearch (a,0,7,4);
    cout << "index: " << i;
    return 0;
}
int binarySearch(int arr[], int low, int high, int x)
{
    if (high > low)
    {
        int mid = low + (high - low) / 2;
        if (arr[mid] == x)
            return mid;
        if (arr[mid] > x)
            return binarySearch(arr, low, mid - 1, x);
        return binarySearch(arr, mid + 1, high, x);
    }
    return -1;
}
```

a) We need to debug our code using lldb. What does -g mean when compiling the code for debugging?

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b) How to add breakpoint at main() function?

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c) How to list information about the currently selected frame?

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8. (1 point) (MSDScript) What would be the output (interp value) of the below?

```
_let x = 5
_in _let y = 10
    _in x+y
```

a) Value:

```
_let x = 15
_in _let z = 5
    _in z+1
```

b) Value:

9. (1 point) Denote by T the true statements, F otherwise.

[] Objective of good code style (layout) is to make the code readable.

[] The best approach to parse input into our MSDscript is deal with input as stream of strings.

10. (1 point) What is the difference between assertions and error-handling?

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11. (1 point) Name 2 debugging strategies and explain them.

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12. (1 point) Check all that apply (using X). Our MSDScript:

☐ interps _function expressions.

☐ interps num and var expressions.

☐ implements operator overloading.

13. (1 point) How to create a static library?

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14. (1 point) What does a namespace represent in c++?

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15. (1 point) When to use test automation (just 3 cases)?

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16. (1 point) Explain the singleton design pattern.

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