SFU ENGAGING THE WORLD

# School of Computing Science
# CMPT 110 - Midterm
# October 20th, 2017 A.D.

**NAME:**_____
**FAMILY NAME** **GIVEN NAMES**

**SFU-ID #:**_____

## INSTRUCTIONS

1. Calculators are **not** permitted.
2. This exam is **closed book**.
3. Clearly print your name and student ID number on this examination (above).
4. This exam contains **multiple choice** questions.

**NOTES REGARDING MULTIPLE CHOICE QUESTIONS:**
- There are **five** possible choices per question.
- There is one **best** choice for full credit (+1).
- The remaining four choices are **worthless**.
- CIRCLE THE LETTER CORRESPONDING TO YOUR CHOICE.

5. The values of all non-multiple-choice questions are stated explicitly in **bold**.
6. There are **45 points** in total
7. There are **6 pages** including this cover sheet.

1. The equation, $x = -b \pm (b^2-4ac)^{½}/2a$,
   a) is effectively computable for all $x$ and constants $a$, $b$, and $c$,
   b) cannot be coded due to the singularity at $a = 0$,
   c) is intractable in terms of its computational complexity,
   d) is effectively computable everywhere except when $b^2-4ac < 0$,
   e) none of these choices.
2. Dijkstra's control structures
   a) explicitly eliminated the *goto* statement,
   b) are indented as good coding etiquette,
   c) were a solution to spaghetti code,
   d) the first three choices,
   e) none of these choices.
3. Which of the following is a valid data type in Visual Basic?
   a) Boolean,
   b) byte,
   c) char,
   d) all of these choices,
   e) none of these choices.
4. The reason why computers are predominantly *digital* as opposed to *analog* is
   a) because analog computers are too difficult to build,
   b) largely historical and related mostly to advances in electronics (transistors),
   c) because of a global conspiracy of elitists who think only in binary terms (right/wrong),
   d) because mathematics is purely digital and, in turn, so to is problem solving,
   e) none of these choices.
5. According to class notes, Von Neumann architecture is a model for designing computers which involves the following three characteristics:
   a) I/O, CPU, and memory,
   b) I/O, ALU, memory,
   c) the subsystems of choice a), the stored program concept, and sequential execution of instructions,
   d) the subsystems of choice b), logic gates, and sequential execution of instructions,
   e) none of the above.
6. Which is NOT part of the definition of an algorithm given in lectures:
   a) well-ordered operations,
   b) unambiguous operations,
   c) effectively computable operations,
   d) produces the correct result,
   e) none of these choices.
7. Electronics is advantageous to computer design
   a) only because electronic devices outperform mechanical devices in terms of speed by many orders of magnitude,
   b) partly because they allow for miniaturization by their very nature,
   c) since they were always the most cost-effective approach,
   d) since electrons themselves behave like miniature computers,
   e) none of these choices.

8. A bit string of at least length ___ is required to represent an alphabet of 999 unique characters in an ASCII-like encoding scheme:
   a) 8,
   b) 9,
   c) 10,
   d) 11,
   e) none of these choices.
9. The imperative programming paradigm is based on the verb
   a) how,
   b) what,
   c) why,
   d) when,
   e) none of these choices.
10. The *instruction cycle* is
   a) the fundamental unit of communication between the control unit and the ALU,
   b) "atomic",
   c) the single-step process of *fetching* from memory,
   d) based upon *The Principle of Locality*,
   e) none of these choices.
11. Visual Basic is considered as:
   a) a 1GL,
   b) a 2GL,
   c) a pure machine language,
   d) a procedural language,
   e) none of these choices.
12. Which of the following is the proper order of procedures used in problem-solving?
   a) analysis, design, coding, testing,
   b) analysis, testing, design, coding,
   c) design, analysis, coding, testing,
   d) order does not matter,
   e) none of these choices.
13. Which is not a proper loop structure?
   a) loop-until,
   b) do-until,
   c) do-while,
   d) for-next,
   e) none of these choices.
14. What does the diamond shape represent in flow charts?
   a) decision,
   b) I/O,
   c) the CPU,
   d) sequential execution of commands,
   e) none of these choices.
15. Syntax relates to
   a) grammar,
   b) the amount of overhead encountered from the interpreter itself,
   c) meaning,
   d) tax on cigarettes and alcohol,
   e) none of these choices.

16. A formal language is a:
    a) set of strings and is not constrained by conflicting meanings assigned to them,
    b) has well-ordered semantics,
    c) is the opposite of a natural language,
    d) is a synonym for pseudocode,
    e) none of these choices.
17. Which is NOT an agreed upon control structure:
    a) goto statement,
    b) unconditional halt,
    c) random execution of statements,
    d) loop structure,
    e) none of these choices.
18. The difference between while-loops and for-loops:
    a) is not worth mentioning since they produce the same result,
    b) has to do with flexibility,
    c) is historical in that for-loop constructs evolved from while-loop constructs,
    d) has nothing to do with the bounding number of loop cycles,
    e) none of these choices.
19. Floating point numbers:
    a) are a subset of the set of real numbers,
    b) are a subset of the set of integers,
    c) are represented perfectly in computers,
    d) means there are a fixed number of digits before and after the decimal point,
    e) none of these choices.
20. Which is NOT a fundamental concept of OOP?
    a) objects,
    b) encapsulation,
    c) inheritance,
    d) polymorphism,
    e) none of these choices.
21. Define the following terms (**1 point each**):
    a) Form

    b) Textbox

    c) Label

    d) Properties Window

    e) Toolbox

22. What does the following VB code do (based on Assignment #2 – **one point**)?

```
Private Sub Button1_Click(sender As Object, e As EventArgs) Handles Button1.Click
    Me.Close()
End Sub
```

23. Describe the two principal features of Visual Basic (**2 points**)

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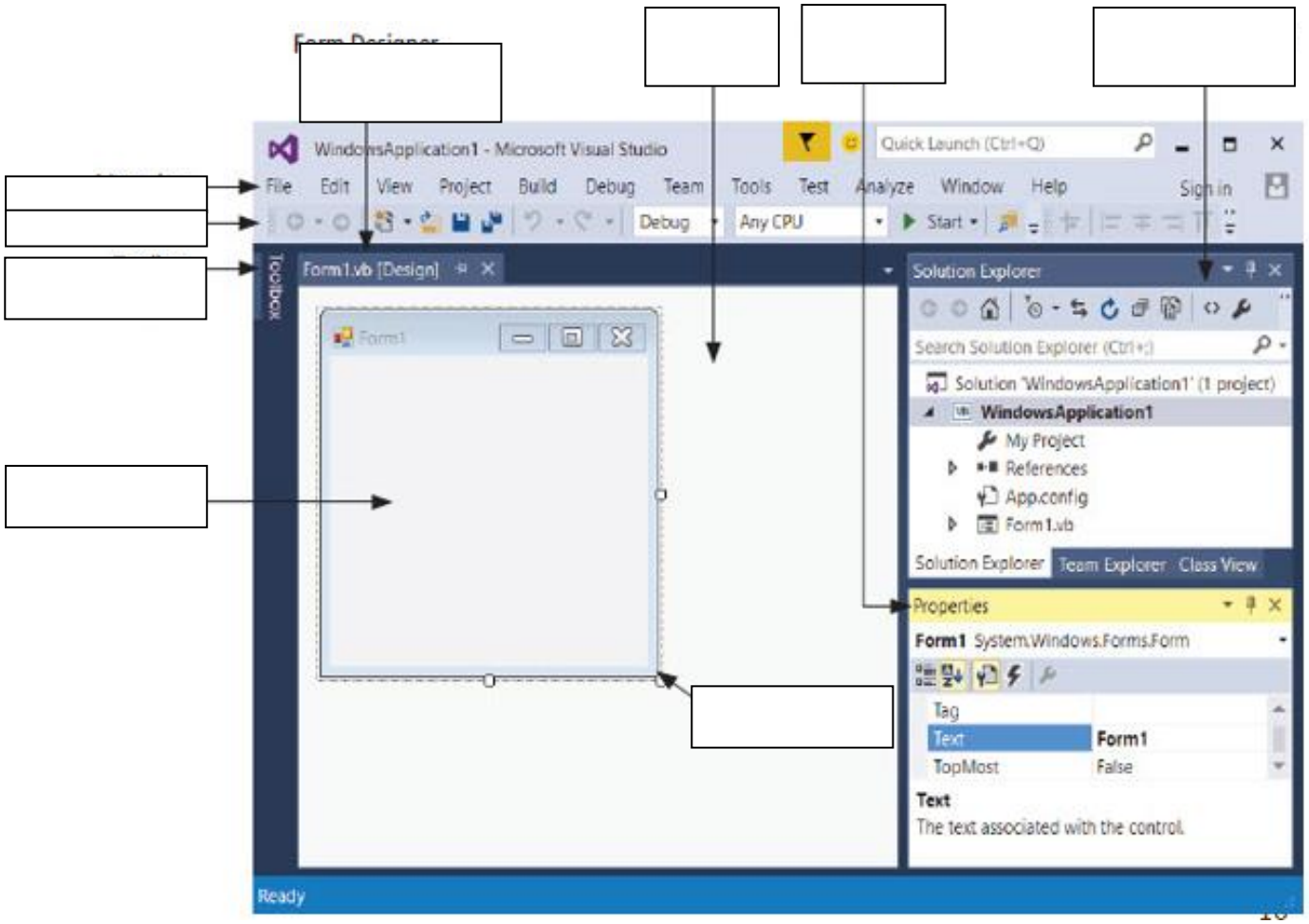
24. What exactly is Visual Studio? (**2 points**)

25. What is the following screen-shot displaying (**1 point**) and describe what are each of the NINE arrows are pointing to (**1 point each**)



26. Given three values, a, b, and c, draw a flowchart that determines which value is the largest of the three and outputs the result. (5 points)