CS4080 Assignment 2

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Questions

1. **Define selection statement.**
   if and switch statements, statements that select code blocks to run

2. **What is the general form of a two-way selector?**
   If then

3. **What is the role of the default segment in a switch statement?**
   The code block that is ran if no others are, essentially the same as the else after a chain of if-elseif

4. **Does Python have a multi-selection statement? If so, does it have a default segment?**
   If,elif,else

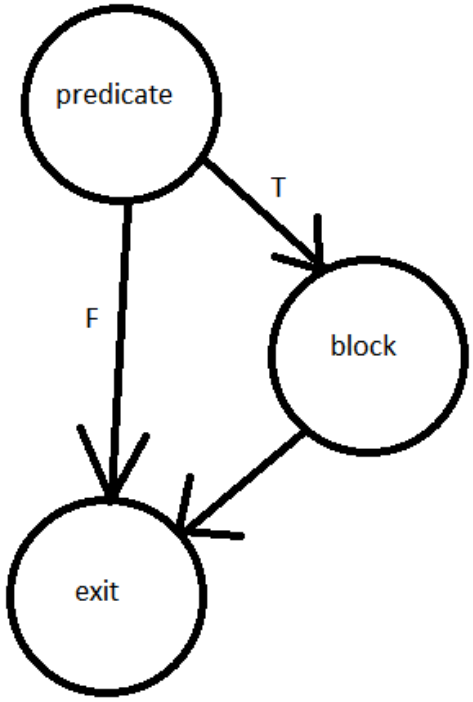
5. **Explain how C#'s switch statement is safer than that of C.**
   Disallows implicit execution of multiple segments

6. **What mechanism does a compiler follow when the number of cases in a selection statement is 10 or greater to optimize the time required to execute?**
   A hash table

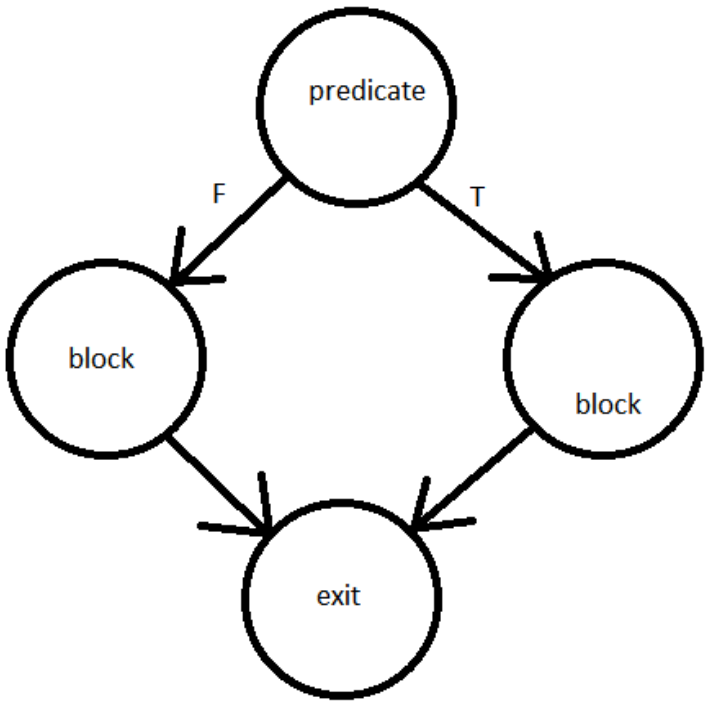
7. **What is a loop variable? What is step-size?**
   Int j = 0; j < 10; j ++
   loop variable = j
   Step-size = 1 (++)

8. **What is the difference between a pretest version and a posttest version of a logical loop?**
   Pre: predicate then code block
   Post: code block then predicate

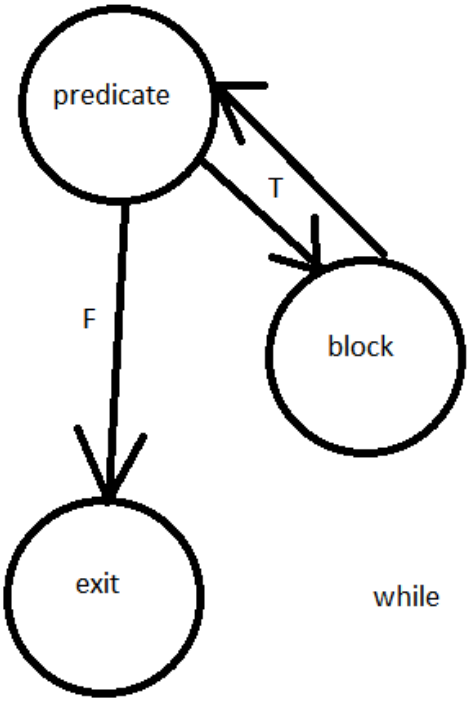
9. **Draw and label the four primes of selection statements as shown in class.**



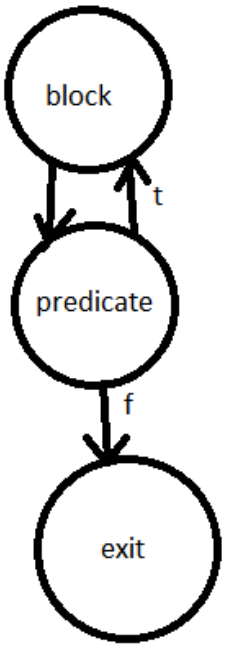
if



if-else



while



do-while

10. **In C, what is the significance of a for loop without the second expression?**

No terminal, it will only exit the loop if there is code inside that does, break or goto

11. **What does the range function in Python do?**
    Creates an iterable object

12. **What alternative is provided for goto in Java?**
    Control loops

13. **What are the differences between the break statement of C++ and that of Java?**
    Java is labeled while c++ isnt.

14. **What is the control structure in java known as that iterates based on data structures.**
    Foreach

15. **What are the pros and cons of using unique closing reserved words on compound statements?**
    Pro: readiblity
    Cons: writeability via more reserved words

16. **What are the arguments, pros and cons, for Python's use of indentation to specify compound statements in control statements?**
    Pro: readability
    Con: tabs vs spaces writability

17. **Speculate as to the reason control can be transferred into a C loop statement.**
    Allows multiple control statements within

Programming Exercises

1) Rewrite the following pseudocode segment using a loop structure in the specified languages:

```
k = (j + 13) / 27
loop:
    if k > 10 then goto out
    k = k + 1
    i = 3 * k - 1
    goto loop
out: …
```

a. C, C++, Java, or C#

```
for(k = (j+13)/27; k <= 10;){
    k++;
    i = 3*k -1;
}
```

b. Python

```
k = (j + 13)/27
while k <= 10:
   k += 1
   i = 3*k -1
```

c. Ruby

```
k = (j + 13)/27
while k <= 10 do
  k += 1
  i = 3*k-1
end
```

Readability: I think python has the best readability because of forced indention

Writabilty: I think the indentation also helps python have the best writability, it would be easier to find errors in your blocks, where in java you or ruby you have to check all your brackets or end statements.

2) Rewrite the following code segment using a multiple-selection statement in the following languages:

```
if((k == 1) || (k == 2)) j = 2 * k - 1
if((k == 3) || (k == 5)) j = 3 * k + 1
if(k == 4) j = 4 * k - 1
if ((k == 6) || (k == 7) || (k == 8)) j = k - 2
```

a. **C, C++, Java, or C#**

```
switch (k){
    case 1:
    case 2:
        j = 2*k-1;
        break;
    case 3:
    case 5:
        j = 3*k+1;
        break;
    case 4:
        j = 4 * k - 1;
        break;
    case 6:
    case 7:
    case 8:
        j = k - 2;
        break;
}
```

b. **Python**

```
if k == 1 or k == 2:
    j = 2 * k - 1
elif k == 3 or k == 5:
    j = 3 * k + 1
elif k == 4:
    j = 4 * k - 1
elif k == 6 or k == 7 or k == 8:
    j = k - 2
```

c. **Ruby**

```
case k
when 1,2
    j = 2*k-1
when 3, 5
    j = 3*k+1
when 4
    j = 4 * k - 1
when 6..8
    j = k - 2
end
```

The case and switch statements really make the code easier to read and write, java's drop thru statements take away from readability and writability when yours checking for errors.

Submission Instructions:

- You should submit a PDF document with your answers to questions 1 - 17. **Do not handwrite and/or scan your answers.** You should use this document and enter your answers in it.
- Submit source code files for the two programming exercises.
    - Do not include the binaries or IDE metadata files, just the source code.
    - Do not define packages or namespaces in c++, java, or C#.
    - Name the files appropriately
- Put these files in a folder labeled, “lastname_firstname_a1” (where “lastname” is your last name and “firstname” is your first name.)
- Compress the folder into a zip file. You can use 7zip or create tarball as well. This will create an archive called, “lastname_firstname_a1.zip” (It may have a “tar.gz” or “7z” file extension depending on the compression scheme).

Your homework must be submitted via Blackboard before the due date.
Do not email your work or submit a paper copy unless instructed to.