APCSP Exam 2 Name _____ Period ____

Identity theft has been going on for centuries, but computers actually make it easier than ever to do. If we think about the minimal set of metadata to define a person, we could use the object map (box) begun below. In Blown to Bits, you read about the REAL ID act and the attempt of the government to collect lots of metadata about people. Blown to Bits tells us that if the government had enough of this data, it wouldn't need any paper ID to identify a person – it would just look at biometric data. **Add one biometric piece to the object map below.**

| |
|---|
| Birthdate |
| Address |
| Phone Number |
| Gender |
| retina image/fingerprint/DNA/skin color/blood type |

½ credit height age wt gender

earlobe size

Your birthdate would be stored as something like: January 1, 2001. If we were to create a system for storing the month you were born in, this system would use a one-place number with a base of 12 whose values would be between 0 and 11. If you ended up storing a bunch of month data all together, a 3-place system would store values 0 to $12^3-1$ (1727) comprising in total of $12^3$ (1728) numbers.

Convert September February into a decimal. Show work.

8 / $12^s$ 1 / $1^s$ 12

$8(12) + 1(12^1) = 97_{10}$

Not starting with zero: $9(12) + 2 = 110_{10}$

Convert September February into hexadecimal. Show work.

6 / $16^s$ 1 / $1^s$ $61_{16}$

3 16 6 96

3 16 6 96 $6E_{16}$

A 10 B 11 C 12 D 13 E 14

Convert September February into binary. Show work.

1 / 64s 1 / 32s 0 / 16s 0 / 8s 0 / 4s 0 / 2s 1 / 1s

$1100001_2$

$1101110_2$

In the ASCII table shown (showing character equivalents to decimals), circle the equivalent character value of Sept Feb.

**Regular ASCII Chart (character codes 0 - 127)**

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | | (nul) | 016 | ► | (dle) | 032 | sp | 048 | 0 | 064 | @ | 080 | P | 096 | ` | 112 | p |
| 001 | ☺ | (soh) | 017 | ◄ | (dc1) | 033 | ! | 049 | 1 | 065 | A | 081 | Q | 097 | a | 113 | q |
| 002 | ☻ | (stx) | 018 | ↕ | (dc2) | 034 | " | 050 | 2 | 066 | B | 082 | R | 098 | b | 114 | r |
| 003 | ♥ | (etx) | 019 | ‼ | (dc3) | 035 | # | 051 | 3 | 067 | C | 083 | S | 099 | c | 115 | s |
| 004 | ♦ | (eot) | 020 | ¶ | (dc4) | 036 | $ | 052 | 4 | 068 | D | 084 | T | 100 | d | 116 | t |
| 005 | ♣ | (enq) | 021 | § | (nak) | 037 | % | 053 | 5 | 069 | E | 085 | U | 101 | e | 117 | u |
| 006 | ♠ | (ack) | 022 | – | (syn) | 038 | & | 054 | 6 | 070 | F | 086 | V | 102 | f | 118 | v |
| 007 | • | (bel) | 023 | ↨ | (etb) | 039 | ' | 055 | 7 | 071 | G | 087 | W | 103 | g | 119 | w |
| 008 | ◘ | (bs) | 024 | ↑ | (can) | 040 | ( | 056 | 8 | 072 | H | 088 | X | 104 | h | 120 | x |
| 009 | | (tab) | 025 | ↓ | (em) | 041 | ) | 057 | 9 | 073 | I | 089 | Y | 105 | i | 121 | y |
| 010 | | (lf) | 026 | | (eof) | 042 | * | 058 | : | 074 | J | 090 | Z | 106 | j | 122 | z |
| 011 | ♂ | (vt) | 027 | ← | (esc) | 043 | + | 059 | ; | 075 | K | 091 | [ | 107 | k | 123 | { |
| 012 | ♀ | (np) | 028 | ∟ | (fs) | 044 | , | 060 | < | 076 | L | 092 | \ | 108 | l | 124 | \| |
| 013 | | (cr) | 029 | ↔ | (gs) | 045 | - | 061 | = | 077 | M | 093 | ] | 109 | m | 125 | } |
| 014 | ♫ | (so) | 030 | ▲ | (rs) | 046 | . | 062 | > | 078 | N | 094 | ^ | 110 | n | 126 | ~ |
| 015 | ☼ | (si) | 031 | ▼ | (us) | 047 | / | 063 | ? | 079 | O | 095 | _ | 111 | o | 127 | ⌂ |

144 12 288 1440 1728

To hold years, (assume 0 to 2017), how large of a binary system would we need? 11-bit system.

Sets of data like that in the map could be used to identify who you are, even without your name. This is called (circle one) re-identification cookies keylogging decidability IP Address

Even more data should go into this object map. This is because even though data is ___I___, having ___II___ data will solve problems better than having ___III___. Fill in the blanks, in order. (circle one)

a) Complex, true/false, an aggregate
b) Misleading and ambiguous, more, less
c) Not precise, binary, decimals
d) Binary, true/false, decimals

c for other version

The **government** is very interested in **aggregated** data about you. What could it use this data for? *Try to use an example based on what was covered in the book or class.*

finding criminal / terrorist
health re - disease spread

US Citizens' federal government records were private from 1974 until 9/11/2001 thanks to the (circle one)
DARPA Moore's Law Patriot Act Megan's Law

Privacy Act or Patriot or DARPA (bad guess)

Imagine you had a signature on a check, just like gets scanned at your bank when you deposit one. The bank photographs it and stores it as a pixelated graphic. It might be fuzzy, but you can make out the signature when you view the photo on your bank's website. Compared to the original photo of the check, this representation is (circle three)

lower resolution higher resolution lossy lossless lower latency higher latency

Banks for years have been trying to develop software that would read a signature to detect when a person signing IS or IS NOT the person (s)he claims to be. Ultimately, the signature can be stored as 0s and 1s. Explain how you would do this, using the example signature shown.


(4)

Cameras aren't just scanning checks. They are everywhere. Circle all of the following that are true based on your homework with Blown to Bits. (circle all that are true)

a) Camera data can be useful for law enforcement.
b) Cameras are mounted in all sorts of places and capture what people are doing, without people seeming to notice.
c) Metadata in Exchangeable Image File Format is linked to camera images.
d) Civil Libertarian Groups are anxious about public camera presence and loss of privacy.

a

When you buy something in a store with a credit card, if it is less than $50, you typically don't have to provide a signature. The trade-off the store is addressing is (circle one):

a) Identity fraud is impossible to catch and stop.
b) It costs more time and money to monitor small purchases than it does if the small purchases are fraudulent.
c) Anyone can legally use a credit card, even if the credit card is not assigned to that person.
d) It is more unlawful to steal $51 than it is to steal $48.

b for other version

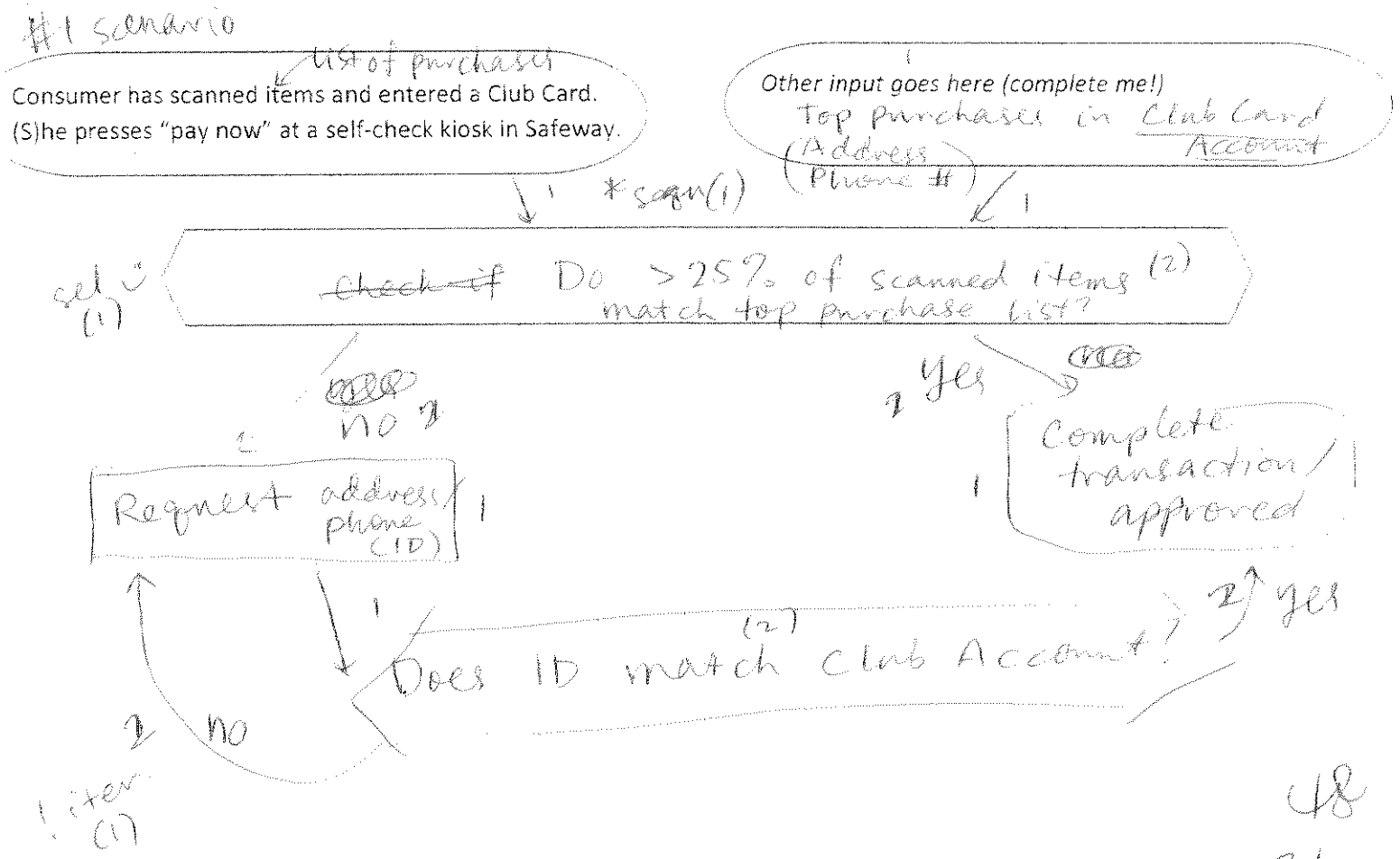
You convince Safeway to use some data to improve their system. You suggest the following:

1. When a Club Card is used, compare that day's purchases against the frequent purchases in that member's account. Machine asks for additional identification (address or phone number) if >25% of the day's purchases don't match the frequent purchase list. After a match of other identification, the purchase is approved. If the match doesn't occur, it asks for additional identification again.
2. When a Club Card is used, compare the name OR address on the club account with the name OR address for the credit card being used. In all cases, all four pieces of data (name, address, name, address) would be regarded. Two of the four pieces of data would need to match for the purchase to be approved. If a match does not occur, the machine asks for a different credit card and tries the matching of metadata again.
3. Assume RFID tags are assigned to each product at Safeway. When an item's RFID tag is read in the checkout area, but does not come up on the running receipt of items, the digital voice at the self-checkout would gently remind the consumer to "pay for the pack of gum, put it back, or ask for assistance." It would compare the item RFID tags against the receipt again to determine if it would repeat the reminder or not.

You write a need statement for the 3rd suggestion. Which is best? (circle one)

a) Safeway needs to provide customers assistance who have trouble using the self-checkout machines.
b) Safeway needs to put its gum and similar small items far away from their RFID scanners so they don't trigger a special response from the self-checkout machines.
c) Safeway customers who accidentally don't scan something need a reminder to scan it, so it can be paid for.
d) Safeway customers who think they can steal because Safeway has removed the human element of a cashier, need a human voice reminder that there is a more moral path.

Safeway agrees to let you model one of these for them. *You choose which one!* Your model has been started below – you will need to **add arrows and more shapes**. Be sure your steps are specific to your case (use specific language). You'll notice that in all three cases, there is comparison between two sets of data – Mrs. Frazier has underlined the two sets for each case, above. Tell which case you are modeling: (circle one) 1 2 3



In your flow chart, put a star ('*') to the left of sequence. If sequence occurs more than once, put the star next to the first sequence step.

In your flow chart, put a smiley face (☺) to the left of selection. If selection occurs more than once, put a smiley face next to the first selection step.

In your flow chart, put an exclamation point ('!') to the left of iteration. If it occurs more than once, label the first iteration.

Safeway is so pleased with your ideas that they build them all. Testing them gives varying results, however. Assume each case is independent of the others. For each, provide a letter. Letters can be used once each.

a) Decidable b) Efficient c) Correct d) Polymorphic e) Complete f) Sound

d The safe RFID software is used in the back of the store to load product onto delivery trucks, to take quick inventory, and to help robots clean the shelves and put products where they belong.

e The address/name matching software has binary variables that have been used in all possible proofs for how the software should work. (But the software doesn't work yet.)

b Purchases using the comparison against the list of most frequent products go much more quickly than purchases did before this software change, as club information is loaded and can be used to speed along a later credit card transaction.

f The RFID tool always sounds an alarm: when there IS something attempting to be stolen (true is interpreted correctly) and when there is not (false is not interpreted correctly).

a The address/name matching software for the club card and credit card always returns an answer, but without any pattern to it (true match is not always true, and no match is not always false).

c The tool using a comparison between the purchases and the most frequent products always gives the response that is expected – it is 100% accurate.

Consider the logic behind checking if the name OR address on a club account match the name OR address on a credit card.

(names match) OR (addresses match) → approved transaction

Or in shorthand:

p OR q → a

We can break this down with propositional resolution and resolve something insightful. Complete the resolution below by filling in the blanks.

| | | |
|---|---|---|
| q → a | {¬q, a} | 4 |
| p → a | {¬p, a} | 4 |
| not a | {¬a} | 2 |
| --- | ---------- ← that's just a bar; don't fill it in | |
| not q OR not p | {¬q, ¬p} | (1) not a in there (2) |

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Extra credit: Reverse *distribution property* of negation to write the conclusion sentence another way.

not (q and p)

+ all or nothing words like (prior answer)