Beginner and Intermediate Course Setter's Workshop

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Introduction.
- Assumes a basic knowledge and skill in orienteering.
- Will focus on general principles of course setting.
- Will describe the duties of course setter, from desktop planning to hanging the controls.

Aim of good course planning.
Courses should be:
- Appropriately designed for the competitor's abilities, both technical and physical.
- Test the both technical and physical abilities of the competitor, but in such a way that the navigating skill will be decisive.
- Fair, so that the skill, not luck, is the decisive factor, and that the best orienteer will win.
- Safe.
- Enjoyable. The competitors should feel that they have been stimulated both mentally and physically.

One should treat "A, "B," and "C" courses as if they were "A" level courses as far as the technical aspects are concerned. All control sites should be correct and suitable for the competitor, and all flags and descriptions should be correct.

Personnel
- Event director (ED). Is in overall charge of the event, particularly the administration .
- Course setter (CS) or designer (the two terms are synonymous).
  - ➤ Responsible for everything relating to the courses, from the start triangle to the finish line.
  - ➤ Designs courses.
  - ➤ Checks that control points in the field are suitable
  - ➤ Makes appropriate map corrections.
  - ➤ Prepares maps and control descriptions.
  - ➤ Hangs controls and places water.
  - ➤ The ED and CS may be the same person for smaller events.
- Prerequisites of CS
  - ➤ Familiar with rules of orienteering.
  - ➤ Familiar with orienteering techniques.
  - ➤ Prior familiarity with terrain and map desirable.
  - ➤ Interest.
  - ➤ Physically capable.
  - ➤ Has available time.
- Vetter
  - ➤ Basically double checks everything the CS does to be sure it is correct.
  - ➤ Checks overall quality and planning of event.
  - ➤ Determines technical and physical difficulty is appropriate for courses.
  - ➤ Checks control locations and attack points in field are correct.
  - ➤ Checks control descriptions.
- Course consultant
  - ➤ Provides advice about course design.
  - ➤ Usually does not do field work.

Basic definitions.
- Control feature. The mapped object, such as a boulder, reentrant, lone tree, etc..
- Control point or the control. The defined point on the control feature, such as the north side of the boulder, the eastern edge of the clearing, the southwest foot of the 3 meter cliff, etc..
- Control marker. The flag hung at the control point.
- Leg. The part of an orienteering course between two controls.
- Attack point. A distinct feature, both on the ground and on the map, that is easier to find than the control and is used as a point from which to approach a control. It is usually 200 meters or less from the control.

- Handrail. A distinct linear feature, such as a path, fence, stream, distinct vegetation boundary, that is used to guide an orienteer in the desired direction.
- Route choice. The option of taking more than one (sensible) route between two controls. This may, for example, be a choice of a longer path route versus a direct cross-country route.
- Decision point. A point at which the orienteer has to decide in what direction to continue, for example being required to change direction at a path junction. A decision point on a leg does not imply a route choice. There may be only one obvious route between controls, but this could require the knowledge to change direction at a number of decision points.
- Collecting feature. A large feature before a control that, when reached, informs competitors that the control is nearby. A collecting feature frequently is a line feature, e.g., a path, fence, or stream, or a large area of distinct terrain, like a meadow or lake.
- Catching feature. Similar to a collecting feature, except that it is a large feature beyond a control which informs competitors that the control has been missed.
- Relocating feature. A distinct feature that may be used by a competitor to identify his or her position both on the ground and on the map, and is used as a point to reestablish the competitor's position after he or she has failed to find the control.
- Lost distance. A portion of a leg that does not require any map reading, for example, a long trail run.
- Dog leg. A control situated such that the best route approaching the control is the same route leaving the control. Introduces unfairness because some competitors may be aided by seeing another orienteer leaving the control.
- GO control. The last control on the course. It is used to collect all the competitors just before the finish.
- Bingo control. An unfair control where luck is more important in finding the control than skill, e.g., a pit in an area of very dense vegetation.

Course planning

General principles.
An orienteering course is defined by the start, the controls, and the finish. These points have precise locations in the terrain and are shown correspondingly on the map. Between these points are the legs, along which the competitor must orienteer.

Legs
- Most important elements of an O course.
- Should provide interesting map reading problems.
- Lead orienteers through good terrain.
- Provide alternative route choice for intermediate and advanced courses.
- Test various skills, mainly for intermediate and advanced orienteers.
  - ➢ Map reading, both rough and fine.
  - ➢ Compass, rough and fine.
  - ➢ Distance and elevation judgement.

Controls
- Uses
  - ➢ To define the beginning and end of a leg.
  - ➢ To prevent dog legs.
  - ➢ To assure road or fence crossings at correct location, and to avoid out of bounds and dangerous areas.
  - ➢ To funnel all courses into finish chute (the GO control).
- Control locations.
  - ➢ First and foremost, the control must be in the right location.
  - ➢ Controls must be suited to the expected skill of the competitors.
  - ➢ Should be on mapped features. Do not use an unmapped feature, such as an unmapped tree in a forest or an unmapped boulder.
  - ➢ Use point features, such as boulders, pits, distinct trees, corners of building, etc. A linear feature can become a point feature if another linear feature crosses or joins it. For example, when you use a path as a control feature, it should be at a junction or crossing with another linear feature (such

as another path, road, fence, stream, etc.) or a bend in the path. Do not use linear features without describing where on the linear feature the control is. For example, if you use a reentrant as a control, it should be located at the upper part or lower part, and described as such.

➤ Should not be in thick or dense terrain. Do not place controls in the medium or dark green areas of the map because it results in a bingo control. Introduces unfairness because finding the control is more dependent on luck than skill.

➤ Map must be accurate at control site and from all possible attack points. However, if you are using an OCAD map, you can make the map corrections before printing. If you are using an offset printed map, do not use that control site if the area is not mapped accurately.

➤ When you are using master maps, do not place a control on a map correction.

➤ Place controls on different courses at least 100 meters apart on similar features. You may place a control closer than 100 meters to another control only if the two controls are on distinctly different features. However, never place two controls closer than 60 meters apart.

➤ Controls must be sited so that the visibility of control flag for runners coming from different directions can be evaluated from the map and control description. For example, do not place a control in a reentrant directly behind an unmapped tree in such a way that it can only be seen from a limited field of view.

➤ On advanced courses, place the flag so that the competitor sees the feature first, not the flag.

➤ Don't choose a control feature as a control site just because it is "good" or interesting if it does not make a good leg that requires map reading and navigational skills. In other words, don't design a course just by picking a bunch of interesting points on the map and joining them together.

➤ Water controls. Should have a water control at a minimum every 2.5 km. of a course, closer if very warm weather. Try to make water controls common controls for several courses. Water controls ideally should be close to a road, so that the water can be carried in a vehicle.

Control descriptions.
• Must be accurate and complete
• If the black, green, or blue X's or O's are used, ideally they should be described in the map's legend, but at a minimum in the course setter's notes.
• Indicate in column C which of similar features in the control circle is the actual control.
• If you use a linear feature, indicate in columns E and F if it has a junction or crossing with another linear feature.
• Give details of appearance of control, e.g., shallow, overgrown, rocky, in column E
• Give dimensions of boulders, cliffs, pits, and clearings in column F.
• Give location of flag in relation to feature in column G.
• Indicate a control has water in column H.
• Give text translation of symbols for white and yellow courses. Orange and advanced courses need only the symbols.
• Ideally, use computer program to generate control description sheets.
  ➤ *Condes* by Finn Arildsen is PC based program. Download from http://www.finn.arildsen.com BAOC has a club license for this program.
  ➤ *Clue Sheet*, by David Dana, is Mac based and allows both symbols with translations. BAOC has a club license. http://www.dataway.ch/~uh/o-software.html
  ➤ Prepare master control sheet initially using letter codes. Convert letter codes to actual number codes after courses have been finalized and the control markers are available for number assignment.

Selection of terrain and major areas
• In any given park, if possible, try to use different terrain from the immediately preceding years. This reduces the advantage some competitors will have because of familiarity with the same terrain.
• Determine assembly, start, and finish areas first.

Assembly area.
• Near parking, drinking water, and toilets.
• Need space for registration, beginner's clinics, master maps, results, picnic area.

Finish area.
• Ideally close to assembly area but somewhat separated so incoming runners don't run into bystanders. Close proximity to assembly area allows participants to see other competitors finish, view results

conveniently, change clothes, socialize with other orienteers, compare route choices and splits, and eat lunch.
- Final control (GO control) should be a common collecting control in view of spectators.
- Streamer the route from GO control to finish.
- Distance from GO control to finish line should be short, since no navigation is required.
- Good visibility to GO control, so finish officials can see approaching runners.
- The final run in should be preferably slightly uphill or flat. Try not to have it downhill, as runners frequently come in too fast and may trip.
- Have finish chute funnel runners into finish.
- Mark exact finish line clearly, preferably with a finish banner. The finish line should be 3 meters wide.
- When using electronic punching, have finish units right at finish line.
- Have slow down chute with a U-turn at the end that brings finishers back towards finish line Allows runners to stay in order and return punch cards to finish officials.
- Have water and/or electrolyte drinks and cups available at finish.
- Have first aid kit nearby.

Start area.
- May have to make tradeoffs between terrain and convenience.
- Ideally, choose an area that has appropriate terrain for both beginners and advanced courses so all courses have same start. White courses require loop path network. Yellow course requires multiple distinct linear features.
- Ideally close to, but separate from, assembly and finish areas. When you have a single start area near the assembly area, it improves the communication among registration, start, and finish, and also is more convenient for competitors.
- Remote start.
  ➢ May have to have remote start in order to utilize best or fresh terrain, decrease climb, or eliminate lost distance.
  ➢ Better to have a remote start than a remote finish.
  ➢ If you have a remote start, describe it in the course setter's notes stating how far it is, how much climb, and how much time to allow to walk to it. Have a map at the assembly area showing the location of the start, and streamer and sign the route to the start well.
  ➢ Ideally remote start will have vehicular access to carry maps and other equipment to start.
  ➢ If remote start is over 500 meters or a 10 minute walk, consider having a closer start for white and yellow courses.
- Should have a warm-up area nearby.
- Start triangle should be out of sight of pre-starters at call up line. If using master maps, have the maps at an area out of sight from call up line. If using a pre-marked OCAD map, have a mandatory route to remote start triangle out of sight from call up line. The actual control triangle should be marked by a control marker without a punch or code, and competitors do not have to stop.

Avoid dangerous areas. Design courses so competitors are not tempted to cross dangerous or out of bounds areas. Insert control(s) so that there are mandatory crossing points of dangerous areas, such as busy roads, deep streams, fences, etc. If unavoidable, describe in course setter's notes, and mark with blue and yellow streamers. Mark all pieces of barbed wire on ground on logical routes with streamers so competitors don't trip or cut themselves.

Drawing board pre-field work.
- Should be started at least 3 months before the event.
- Rough out general configurations of courses. For advanced courses, design blue (or longest) course first. Establish long legs first. Other advanced courses can be subsets of the blue course with some shared legs and forking to reduce following.
- Have separate first controls for each course.
- Draw circles on master map in pencil to facilitate revisions or use Condes course layout editor. Use letter codes for controls. I use single letters, e.g. A, B, C, etc. for advanced courses, with the blue course being consecutive, and the other non-blue advanced controls later in the alphabet. I use WA, WB, etc. for white, YA, YB, etc. for yellow, and OA, OB, etc. for orange.
- Develop master control description sheet. This will be done automatically with Condes

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- Measure distance and climb of courses. The distance is automatically calculated with Condes. Compare with distance table and make any obvious adjustments.
- Course winning time and length guidelines

Course	Winning Time	Distance Ratio	USOF Distance	BAOC Distance
White	25-30 min	20-25 %	2.0-3.0 km	1.5-2.0 km
Yellow	35-40 min	40-45 %	3.0-5.0 km	2.5-4.0 km
Orange	50-55 min	50-55 %	4.5-7.0 km	3.0-5.0 km
Brown	45-50 min	34-38 %	3.0-5.0 km	3.0-4.5 km
Green	50-55 min	50-55 %	4.5-7.0 km	3.5-6.0 km
Red	60-65 min	70-75 %	6.0-10.0 km	5.0-8.5 km
Blue	75-80 min	100 %	8.0-14.0 km	7.0-12.0 km

- Courses should meet guidelines as to winning time, not length. The winning time is affected by such factors as length, amount of climb, technical difficulty of terrain, dense vegetation, weather, etc.
  - Winning time is based on what the best orienteer in the country (100 points in USOF rankings) would take to complete the course, not based on who shows up for an event. Therefore, the winning times suggested above should almost always be shorter than the actual winning time at a local BAOC event.
  - See attached list of BAOC orienteers and their expected winning times on courses.
  - Use above guidelines, distance table, and results from previous events to help determine appropriate course length.
  - Bay Area terrain is very steep. The distances on local courses usually are less than described in standard publications. Do not make courses physically exhausting, especially on white, yellow, orange, and brown. A major problem with BAOC courses has been that they are too physically demanding.
- Measure distance as a straight line between controls, except deviate around impassable objects (such as a lake) or out of bounds areas. Condes will automatically calculate the distance. If you are designing the course on a map that is on OCAD, the easiest and most accurate way is to use the straight line tool, and draw one continuous line from the start to the finish with points at all of the intermediate controls. Then click the edit tool, and under the edit pull down menu, measure object. This will give you an accurate measure of the course. If the map is not on OCAD, or you are not designing the courses using OCAD, and are not using Condes course layout editor, use the straight edge of a piece of paper, preferably legal size, and place one corner on the start. Mark on the edge of the paper the position of the first control, and make a little mark. Rotate the paper so that the first control begins at the mark and goes to the second control. Make a second mark. Continue until the entire course is marked. Then using the scale on the map, measure the total distance from the start and finish. Do this for every course.
- Measure the climb. There are multiple ways to measure the climb: the straight line route, the optimal route, the route with the least climb, etc. As a consequence, climb is somewhat subjective. Most course setter's measure climb as the "optimal" route. For a good orienteer, this is usually relatively straight, but with some contouring around very steep hills or reentrants, and going around large areas of fight. To measure the climb, count the number of uphill contour lines that an orienteer would traverse following the optimal route. Ignore contour lines on downhill sections of the route. Multiple the number of contour lines by the contour interval (usually 5 meters) and record that as the amount of climb.
- National and international standards state that the climb should be 4% or less on a course. However, this frequently is not possible in the Bay Area because of our steep terrain. Try to keep the climb to 5 or 6%.

Field work
- Should be started at least 2 months before the event. Plan ahead to allow ample time to do good job in the field. Don't leave it to the last minute.
- Safety precautions.
  - Try to limit field work to 6 hours per day maximum. Beyond that, one gets physically and mentally tired, and it is easy to make mistakes.
  - Take plenty of water. 70 oz. bag worn on back with plastic drinking tube is ideal. Can be obtained from mountain bike shops or REI.

- ➢ Take lunch, large roll of brightly colored plastic surveyor's tape, permanent black ink felt tip pen, master map with control circles, pencil and eraser, ball point pen, master control description list, base plate compass, preferably sighting model, spare compass, control stakes, whistle, snake bite venom suction remover, windbreaker, hat, sunscreen, insect repellant.
  - ➢ Optional, but highly desirable: wool hat and polypropylene gloves in cold weather, cellular phone, colored pencils and map board to make map corrections.
  - ➢ Tell spouse or friend where you are going to be in park (leave map with area marked) and when to expect you back home.
- Walk each course taking controls in order. For long legs, walk each reasonable route choice to make sure map is accurate. Allow 60 min/km. for the intermediate and advanced courses.
- Ensure that all major obstacles (such as fight, un-crossable reentrants, cliffs) on likely routes are mapped so that a small change in route choice does not result in major differences in results. Note corrections on map.
- Check each control site for appropriateness.
- Check bearing and pace count from every attack point.
- If map needs corrections between the attack point and the control, either find another control site, or, if map is in OCAD, mark map corrections.
- Hang streamer at exact height and position you want flag. Use on-sight materials if necessary, or take stakes with you.
- The height of the control marker should be suited to the individual case. If the map is suboptimal, or the control is a small feature in a generally flat and featureless terrain, the control should be hung higher.
- Mark control code, date, and initials on streamer with permanent black ink. (Other colors fade in sun.)
- Write down complete control description including size of feature and where on feature control marker is located on master control description sheet.
- Frequently control sites which look good on paper are not good in the field. Expect at least 10% of control sites to be unusable, more with older maps.
- If you add a new control site because a previous site was unacceptable, use a different code letter for the new site to prevent errors and confusion with older drafts of courses.
- At home, revise courses as necessary, add and delete controls as determined in field,, make map corrections to master maps, and make corrections to master control description list.

Course Guidelines

White course guidelines.
- Participants
  - ➢ First time orienteers with 15 minutes of instruction.
  - ➢ Families with small children.
  - ➢ Youth groups.
  - ➢ Competitive course for children 12 and under.
- Winning time: 25 to 30 minutes; median time 50 minutes.
- Distance: 2.5 km or less.
- Climb: 120 m or less.
- Required map skills: Map orientation and reading major line features. The compass should not be required except to orient the map.
- Objective is to introduce basics of the sport, organization, rules, and techniques.
- Scale should be 1:10000 scale or ideally 1:7500. Larger scale maps are easily printed up when the map is on OCAD.
- Map with course should be made available at registration, either pre-marked OCAD (preferable) or master map available at assembly area.
- The terrain ideally should have a path network that allows a loop course, not be too steep, and have nice vegetation.
- Course should be predominantly, if not exclusively, on trails. If not on trails, it should follow other obvious linear features, such as a fence.
- The start should be on a line feature. If it is not on a line feature, the leg should be streamered until a line feature is reached, usually the first control.

- First control should be in sight of the start. The hardest part for beginners is to get started in the right direction.
- Legs should be short, no more than 400 m, with most of them about 200 m.
- Put a control at each decision point such as every trail junction or crossing that requires the orienteer to change direction.
- Site controls 2 to 5 m beyond and visible from junction to lead them onto the correct trail.
- Controls should be on linear features, or perhaps later in the course, a raised point feature, such as an obvious boulder or lone tree, a few meters from the path but readily visible from it.
- Make sure there are no other nearby controls with which participants could become confused.
- Do not share controls with other courses.
- Hang control markers at eye height, 1.5-2.0 meters, but not so high that a 10 year child can't see them. They should be easily visible.
- If absolutely necessary, there may be an off trail segment to complete a trail loop. This off trail route should be well marked with orange and white streamers. This should be described in the course setter's notes and marked on the clue sheet.
- Streamer any indistinct or overgrown path.
- Make map corrections if necessary to be sure the map shows all paths, fences, buildings, and other cultural features. These are the items that beginners relate to, not contour lines.
- Do not have any route choice problems.
- Do not design any legs that requires the use of the compass.
- Course should not require the ability to read contours, vegetation, or minor point features.
- Avoid the temptation to make the white course more "interesting," by using legs and control sites appropriate only for the more advanced courses. Advanced orienteers frequently have a problem sticking to criteria for a white course. Try to remember that the white course may be run by an unaccompanied eight year old.
- Beginners have more than enough problems with the map itself, trying to relate all those colors and funny symbols to the ground. The course should serve as a guided tour, allowing them to learn how to read the map.
- A well designed white course should not have any DNF's. You want beginners and children to be successful and not frustrated by not being able to find controls that are inappropriate.
- You can never make a white course too easy!

Yellow course
- Advanced beginner course.
- Winning time: 35 to 40 minutes; median time: 60-70 minutes.
- Length: 3 to 4 km.
- Climb: 150 m. or less.
- Participants
  - ➢ People who have successfully completed a white course.
  - ➢ First time orienteers with previous background of using topographical maps, such as backpackers.
  - ➢ Orienteers who do not want to do much off trail hiking.
  - ➢ Competitive courses for 13 and 14 year olds.
- Objectives: Increase map reading skills, introduce some off trail work, and introduce simple route choice.
- Required map skills: All white skills and knowledge of vegetation and water features. Beginning compass may be introduced.
- Legs should have good handrails at all times. Try to use non-trail linear features as much as possible, such as fences, power lines, streams, distinct vegetation boundaries, etc.
- Controls should be on either distinct line features or on raised point features immediately visible from the line feature, and no more than 50 meters away.
- Use large features, e.g., top of a hill, north side of a pond, foot of a 3 m. cliff.
- Have first two or three controls relatively easy.
- Vary leg lengths. Can have legs up to 600 m., with the majority being between 200-400 m.
- Do not share controls with other courses.
- Desirable to have mild route choice, e.g., choice of a longer trail route versus a shorter non-trail route, such as a creek. Also, design courses so orienteer can safely cut corner before a path junction.
- No legs should require any compass use. However, you may design a leg that would have a quicker cross country route using rough compass, as long as you have an alternative, safer route along handrails.

- Hang flags at eye level, 1.5 to 2.0 m high, and easily visible.
- There should be less than 5% of the entries being DNF's.

Orange course
- Intermediate technical level.
- Winning time: 50 to 55 minutes; median time 75-90 minutes.
- Length: 3.0-4.5 km.
- Climb: Ideally 200 m or less.
- Participants.
  - ➢ Intermediate orienteers, who have successfully completed 4 to 5 yellow courses.
  - ➢ Competitive course for 15-16 year olds.
- Objectives: to bridge the gap between a beginning orienteering course requiring rudimentary map skills to an advanced course requiring all orienteering techniques and skills. Emphasis on learning contour reading. Provide route choice with reward to faster, cross country route.
- Fastest route should be cross country, but provide a safer, slower trail or other handrail route.
- Less distinct handrails can be used, such as broad valleys, spurs, less distinct vegetation boundaries.
- All controls should have distinct attack points.
- Raised features (knolls, boulders, etc.) can be within 100 meters of attack point on a line feature.
- Sunken features (depressions, pits) should be adjacent to attack point on a line feature.
- Have catching features behind all controls.
- Make first controls more "yellowish."
- Vary leg length.
- Can design legs requiring the use of rough compass, but not one requiring an accurate bearing and pace counting.
- Do not share controls with advanced courses.
- Test:
  - ➢ Route choice.
  - ➢ Running directly to a catching feature instead of following a line feature.
  - ➢ Rough compass.
  - ➢ Navigation by contour information.
- There should be less than 15% DNF's.

Advanced courses
- All advanced courses should be difficult technically, and vary only in the physical effort required.
- Ideal terrain for advanced courses:
  - ➢ Detailed.
  - ➢ Forested.
  - ➢ Few line features.
  - ➢ Few large features.
  - ➢ Accurately mapped.
  - ➢ Variety.
  - ➢ Limited visibility.
  - ➢ Pleasant runnable forest.
  - ➢ Complex contour detail.
- Purpose is to test the competitor's skills.
  - ➢ Rough and fine map reading, especially contour detail.
  - ➢ Rough compass use, but still should require constant map reading, distance measurement, and alertness.
  - ➢ Fine compass reading.
  - ➢ Distance judgement, including pace counting.
  - ➢ Elevation judgement.
  - ➢ Route choice selection.
- Techniques
  - ➢ Introduce many challenges.
  - ➢ Long legs for route choice.
    - Creates intellectual challenges.
    - Spreads out the competitors.
    - Each course should have at least 1 long leg. For the blue course, ideally there should be two long legs which would cover about 33% of the total course distance.

A long leg should not exceed 20% of the total course distance.

Make sure there are no big collecting features on any of the routes.

Don't just offer the choice of several different simple hand rail routes that do not require the competitor to think.

If you provide a choice of avoiding a more difficult navigational problem by taking a longer route, the less thought that route requires, the longer it should be.

Don't offer a route that mere running skill will give a decisive advantage to the orienteer.

Don't make so complex and difficult that it becomes unsolvable in competition conditions. It must always be possible with orienteering skill and a reasonable amount of thought to recognize which is the better route.

- ➢ Short legs to test fine compass bearings and pace counting.

    Even in expert hands, the compass is only accurate to around plus or minus 5 degrees. Therefore, observe 10% rule, which requires the control marker to be visible to an orienteer missing it by a distance of around 10% of the distance from the attack point to the control if there are no other features that can guide the orienteer to the control. For example, if the control is a pit 200 meters away from the attack point, the control marker must be placed so that it is visible 20 meters on either side of the control. If the forest is too thick for it to be seen 20 m away, do not use it as a control point.

- ➢ Change elevation between controls.
- ➢ Navigation through featureless areas.
- ➢ Use end-of-line features head on.
- ➢ Reentrants from above.
- ➢ Invite parallel errors.
- ➢ Change direction of legs.
- ➢ Variety of legs.
- ➢ Place controls on small features.
- ➢ Place control as far away from attack point as possible.
- • Avoid
    - ➢ Doglegs.

        Can be caused by two legs forming an acute angle, or due to the surrounding terrain, the best route into the control is also the same as the best route exiting the control.

        Eliminate by inserting an extra control on the exit side a couple hundred meters away.

    - ➢ Lost distance.

        Portions of a leg where no map reading is required.

        Can result from
        - ▪ having a large portion of the route on a path, road, or other obvious handrail
        - ▪ the control feature at the end is too large
        - ▪ there is an easy collecting feature before the control.

    - ➢ Mindless climb. Don't put a control on the top of a steep hill, only to bring the competitors right back down again.
    - ➢ Hokey-Cokey controls. A series of controls on one or the other side of a path.
    - ➢ Collecting and catching features too close to the control.
    - ➢ Large relocating features too close to the control
    - ➢ Obvious handrails.
- • Course design techniques
    - ➢ Use Condes course layout editor.
    - ➢ Use a red string as a guide to show leg on map. The red line makes it easier to appreciate the actual leg, and can easily be moved around to show the optimal location of the beginning and ending controls.

Vetting & Meet Preparation

Vetter's responsibilities
- • Should be started at least 1 month before the event.
- • Review courses to see that they are of appropriate length and technical level.
- • Check each control site for appropriateness and correct location.
- • Pace count and take bearings from each attack point.

- Vetter either hangs a second streamer of a different color with the control code, date, and initials, or else annotates course setter's streamer.
- If course setter and vetter disagree about a control's location, they should go out in the field together and revisit the site and come to a consensus about the control's location. Any incorrectly placed streamers should be removed.
- **Placing the control in the right location is the most important task of the course setter and vetter!** There should be no doubt in either person's mind that the control is located correctly.

Practice runs

It is ideal to either run each course yourself, or have a club member who cannot attend the event run the courses to check on their length and how they flow. Some final adjustment can be made to course length if necessary.

Assignment of control codes when using standard pin punches.
- Should be accomplished at least 2 weeks before the event, earlier if you can get the controls sooner.
- Get control markers and other equipment (master map boards, finish banner, control stands, etc.) from regional equipment director: Mark Blair in the East Bay, Alan Glendinning in the South Bay, and Gary Kraght in the North Bay. Try to get markers several weeks in advance.
- Check control markers to be sure that each one has a punch, a plastic plate with its unique code number, and that the cords are intact and in good shape.
- Markers #100, 199, 200, and 299 have three punches attached to them. Use these markers for the GO control, and any control that may have a high usage like a common water control.
- Assign code number from bag. Replace the temporary letter code with this code number in the computer program.
- Mark new number code on previously printed master control description list, so you have both the temporary letter codes, and the final number codes, for each control.
- After all the proper number codes are in the program, develop the courses using the controls with their correct bag number.
- Print out a clue sheet for each course, and double check that it is correct.
- If you are using OCAD printed maps, replace letter codes on OCAD master map with the correct number codes.
- Make a copy of the master map and check that the control codes on the map and on the clue sheets are the same for each control on each course.
- Make several copies of the master map with code numbers to be used for hanging controls and for control pickup.
- Make master punch cards for each course. Organize control markers by course, and take the appropriately colored punch card, and punch each box with the punch of the appropriate control.

Assignment of control codes when using electronic punches.
- Must use codes between 31 and 255. Do not use 66, 99, and preferably not 68, 86, 89, and 98.
- Preferably use codes beginning with 101, and continue with 102, 103, etc.
- Replace temporary code letter with new number code in Condes using Global Substitution.
- Print out 5 copies of master maps with all controls with new control numbers.

Control Description Sheets
- Print up, cut, and sort adequate numbers of clue sheets for each course.

Making master maps using older offset printed maps.
- Should be accomplished at least 1 week before the event.
- Obtain maps from the mapping director, Bob Cooley.
- Map corrections. Make at least 3 copies. Show the correct fold of the map so that it will fit in the map case. These will be used by competitors to mark their own map with the corrections at the assembly area.
- Master maps of courses with controls. Make at least 3 copies each of the white and yellow courses, and 2 copies each of the orange and each advanced course. Master maps must show the map corrections.
- Use a purple pen. Red ink is hard for color blind men to see.
- Use a 5 or 6 mm circle template. Center the template circle directly over the control. Make breaks in the control circle if it obscures an important feature.

- Indicate the start with a triangle. Point one tip of the triangle in the direction of the first control. Indicate start to be where navigation starts, namely, the location of the master maps, not the call up line.
- Indicate the finish with a double circle.
- Use connecting lines to join the controls. Make breaks in the lines if they obscure important features.
- Place numbers of controls near the appropriate control but do not obscure important features. Position the numbers so that they can be read when the north end of the map is at top.
- Double check each master map to be sure the right controls and right locations are marked.
- Enclose maps in map cases of the map boards.
- Check to see that each pen writes properly. If not, replace with a new purple ink ball point pen.

OCAD maps
- Meet with Bob Cooley at least several weeks before the event.
  ➢ Put in map corrections.
  ➢ Put controls and courses into OCAD. If you have used the Course Layout Editor in Condes, the easiest way is to send the Condes file to Bob. He can then import the courses, with clue sheets, directly into OCAD and print out the maps.
  ➢ Print test map for each course. Carefully check to see if right controls are present and correctly centered.
  ➢ Determine how many maps of each course to print. Use previous years' results, publicity efforts, pre-registration by e-mail, and weather forecast to help decide.
  ➢ Print a few blank maps in case attendance is greater than expected.
- Tape or paste copy of control description sheet on each map if not already printed on map.
- Place orange and advanced courses in plastic map cases, but don't seal unless it is an A meet.
- Place maps in boxes or plastic trays.

Course setter's notes.
- Should be completed at least 1 week before the event.
- Describe courses offered and their length, climb, and number of controls.
- Describe the terrain, e.g., steepness, type of forest, technical difficulty.
- Describe the map. Indicate the scale, contour interval, and any non-standard symbols used. Indicate general overall quality of map.
- Specifically describe what the black, green, and blue X's and O's mean.
- Indicate if the maps will be pre-marked or whether master maps will be used.
- Describe hazards and out of bounds areas.
- Indicate if there is a remote start and how far and how long it will take to get to.
- Post on the BayOnet and web page at least one week before the event.

Hanging controls.
- Equipment needed: Master map with control code numbers, master control sheet description, map of each course (optional but desirable), control markers arranged in the order you plan on hanging them, control stands, hammer, backpack, compass, surveyor's tape, extra cord, extra punches, knife, cigarette lighter to seal nylon cord from raveling, water, food, plus safety items used for field work.
- Electronic punches. Ideally, the stands and flags should be hung several days before the event. Contact EP coordinator (Robert Lewis) to see who the EP leader for the event will be. Discuss with him or her the timing and pick-up of the SI units, usually the day before the event. Place EP units on stands the day before the event, or the morning of the event if the controls are visible from a trail. If you do not have time to make two trips, the stands, controls, and units can all be hung at the same time the day before the event. However, this may make for a long day.
- Transportation. Talk to the ranger. He or she will frequently let you drive in a car to help set controls and carry water to remote water stops. Some course setters like to use a mountain bike to help get around the area.
- Only the course setter or vetter should hang the controls. If you let any other person hang them, there is too great a chance that they will be hung at the wrong location or at the wrong height.
- Hang control at location of the streamer. If streamer is not there, it will be necessary to recheck the control location from the attack point to be sure you are at the correct location. Occasionally, cattle or deer will eat streamers, but there usually is a little bit left tied to the branch.
- Hang control at proper level. If on an advanced course, use a control stand if necessary so that a competitor sees the feature before the flag. Most advanced controls should be hung between 0.5 and

1.0 meters high. White, yellow, and orange course controls should be hung about 1.5 to 2.0 meters high.
- Do not hide the flag. Control markers should be readily visible when a competitor reaches the correct side of the feature. Do not place control flat against a tree trunk, or stuck in thick vegetation. If streamer is higher than control, remove it, and attach it to the control stand.
- After hanging each control and double checking the number and description, check it off the list master control description list.

Electronic Punching
- Contact EP Coordinator (Robert Lewis) to see who is going to be the EP leader for the event.
- Send control numbers (must be between 31 and 255) and courses to EP leader as soon as this information is finalized. He has to enter it into the computer in order to program the controls.
- Meet with EP leader the day before the event, usually in the morning, to pick up programmed control units. The control number will be on a plaque that is attached to the unit by Velcro.
- Place control units on stands the day before the event, or if the control is visible from a trail, the morning of the event.
- Meet with EP leader the morning of the event to pick up check, clear and start controls for the start, and finish controls for the finish.

One to three days before event.
- Hang the controls that are not in sight of trails.
- Place the water out on the courses at the water controls.
  - ➢ Have at least 8 oz. of water for every competitor who is expected to visit that control. One gallon of water will then be adequate for about 16 orienteers. Have more water if the weather is predicted to be hot.
  - ➢ Place a minimum of 1 gallon at every water stop, and for water controls that are common to more than one course, the 2.5 gallon bottles are convenient, since they have a handle that is easier to carry.
  - ➢ Use 7 ounce cups. The others are too small.

Day of event
- Hang all of the controls that are either on trails or visible from trails the morning of the event. This will mean that all of the white and probably most of the yellow controls will have to be hung the day of the event.
- Hang the GO control. Streamer the route from the GO control to the finish line.
- Set up the finish area with the finish banner and chutes and finish EP unit.
- Set up the start area. Place the clear and check EP units near the start. Place the EP start unit at the start line. Place pre-marked maps in boxes or trays at call up line, or place the master map boards at the start triangle. Hang remote start triangle if one is used, and hang streamers from it to the call-up line. Give instructions to the start officials. Make sure that they are situated so that pre-starters cannot see the direction orienteers are leaving from the start triangle. The start official should observe that each competitor uses the check unit for the SI card if EP is used.
- Have some early runners start between 8:00 and 9:00 a.m. to make sure that all controls are still in place. Have spare controls, duct tape, and a black felt tip marker available to replace any missing control. Place the duct tape over the number on the replacement bag, write in the correct number for that control, and re-hang it in the correct location.
- Anxiously wait at the finish until the first finisher on each course has arrived and confirmed that all controls are in their correct locations.
- Ask competitors about specific routes they took for certain controls to see if they appreciated your course design.
- After 2:00 p.m., divide controls up into logical areas for control picker uppers to retrieve. Have a master map with control numbers and a master control description sheet for each volunteer. Circle the area that each person is to retrieve controls.
- Inventory controls to be sure all of them have been collected.

References
- IOF *Principles for Course Planning*

- British Orienteering Federation *Course Planning*
- USOF *Course Design Guidelines,* http://www.us.orienteering.org, then click on Club Resources, and then on Competitive Expertise
- USOF *Rules for Orienteering Events,* http://www.us.orienteering.org, then click on Club Resources, and then on Competitive Expertise
- Graham Nilsen *Course Planning*
- *BAOC Meet Director's Timetable and Checklist,* http://www.baoc.org/misc/dirlist/DirListIndex.html
- Joe Scarborough *BAOC Technical Workshop Planning Advanced Courses 9/7/96*
- Ian Tidswell *BAOC Course Setting Guidelines* (Draft)
- New Zealand Orienteering Federation Technical Committee, *Mapping Newsletter* and *Planners and Controllers Newsletter*
- SEOA *Planning Guidelines*
- Scott Donald *Course Planning Workshop 1995*
- Canadian Orienteering Federation *B Meet Organizing Manual*